FURUNO

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MARINE RADAR/ARPA
FAR-2137S/2837S/2137S-BB
Installation Manual

Comply with MSC.192(79)

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FURUNO ELECTRIC CO., LTD.

www.furuno.co.jp

(Elemental Chlorine Free)

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(HIMA) FAR-2137S/BB/2837S

・FURUNO Authorized Distributor/Dealer

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SAFETY INSTRUCTIONS

The operator and installer must read the applicable safety instructions before attempting to install or operate the equipment.

DANGER	Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

Warning, Caution | Prohibitive Action | Mandatory Action

DANGER



Wear a safety belt and hard hat when working on the antenna unit.

Serious injury or death can result if someone falls from the radar antenna mast.

WARNING

Radio Frequency Radiation Hazard

The radar antenna emits electromagnetic radio frequency (RF) energy which can be harmful, particularly to your eyes. Never look directly into the antenna aperture from a close distance while the radar ius in operation or eexpose yourself to the transmitting antenna at a close distance. Distances at which RF radiation level of 100, 50 and 10 W/m^{2}are given in the table below.

Note: If the antenna unit is installed at a close distance in front of the wheel house, your administration may require halt of transmission within a certain sector of antenna revolution. This is possible. Ask your FURUNO representive or dealer to provide this feature.

Model	Transceiver	Magnetron	Antenna*1	100W/m^2	50W/m^2	10W/m^2
FAR-2137S*2 FAR-2837S	RTR-080 (S-30 kw)	MG5223F	SN30AF	0.1 m		2.4 m
			SN36AF	0.1 m	0.7 m	2.0 m

*1 SN30AF: 10 ft SN36AF: 12 ft

*2 FAR-2137S: available in blackbox configuration.

⚠ WARNING

Do not open the equipment unless totally familiar with electrical circuits and service manual.

ELECTRICAL SHOCK HAZARD

Only qualified personnel should work inside the equipment.

Construct a suitable service platform from which to install the antenna unit.

Serious injury or death can result if someone falls from the radar antenna mast.

Turn off the power at the mains switchboard before beginning the installation.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or damage the equipment .

Use only the specified power cable.

Fire or damage to the equipment can result if a different cable is used.

Do not install the monitor unit, processor unit or control unit where they may get wet from rain or water splash.

Water in the units can result in fire, electrical shock, or damage the equipment.

Attach securely protective earth to the ship's body.

The protective earth (grounding) is required to the AC power supply to prevent electrical shock.

⚠ CAUTION

Observe the following compass safe distances to prevent deviation of a magnetic compass:

	Standard compass	Steering compass
Antenna Unit (30 kw)	3.95 m	2.55 m
Monitor Unit (MU-201CR)	1.55 m	1.00 m
Monitor Unit (MU-231CR)	1.85 m	1.20 m
Processor Unit (RPU-013)	1.35 m	0.85 m
Control Unit (RCU-014)	0.30 m	0.30 m
Control Unit (RCU-015)	0.95 m	0.60 m
Control Unit (RCU-016)	0.65 m	0.45 m
Power Supply Unit (PSU-007)	0.85 m	0.55 m
Memory Card Interface Unit (CU-200)	0.90 m	0.60 m
Junction Box (RJB-001)	1.10 m	0.70 m
Switching Hub (HUB-100)	1.00 m	0.60 m
Monitor Unit (MU-190)	1.65 m	1.05 m
Monitor Unit (MU-231)	0.85 m	0.55 m

EQUIPMENT LISTS

Standard Supply

Name	Type	Code No.	Qty	Remarks	
Antenna Unit	SN30AF	-	1	Radiator	
	RSB-098	-	1	200 VAC 3ϕ 50 Hz, 220 VAC 3ϕ 60 Hz	Antenna Chassis
	RSB-099	-		380 VAC 3ϕ 50 Hz, 440 VAC 3ϕ 60 Hz	
	RSB-100	-		220 VAC, 3ϕ, 50 Hz	Antenna Chassis for HSC
	RSB-101	-		220 VAC, 3ϕ, 60 Hz	
	RSB-102	-		440 VAC, 3ϕ, 60 Hz	
Power Supply Unit	PSU-007	-	1		
Monitor Unit	MU-201CR	-	1	For FAR-2137S	
	MU-231CR			For FAR-2837S	
	MU-190			For FAR-2137S	
	MU-231			For FAR-2837S	
Processor Unit	RPU-013	-	1	AC type	
Control Unit	RCU-014	-	1	Standard type	
	RCU-015			Trackball type	
Installation Materials*	CP03-27201	008-538-720	1	For antenna unit	
	CP03-25700	000-080-435	1	15 m signal cable RW-9600	
	CP03-25710	000-080-436		30 m signal cable RW-9600	
	CP03-25720	000-080-437		50 m signal cable RW-9600	
	CP03-25730	000-082-191		40m signal cable RW-9600	
	CP03-25800	000-080-434	1	Cable assy. for monitor unit	
	CP03-25602	008-535-940	1	For RPU-013, AC set	
	CP03-27301	008-538-740	1	For PSU-007	
Accessories*	FP03-09810	008-536-010	1	For monitor unit	
	FP03-09850	008-535-610	1	For RCU-014	
	FP03-09860	008-535-690		For RCU-015/016	
	FP03-10101	008-538-730	1	For antenna unit	
Spare Parts*	SP03-14404	008-535-910	1	For processor unit 100 VAC set	
	SP03-14405	008-535-920	1	For processor unit 220 VAC set	
	SP03-14401	008-535-990		For monitor unit, AC set	

*: See lists at the end of this manual.

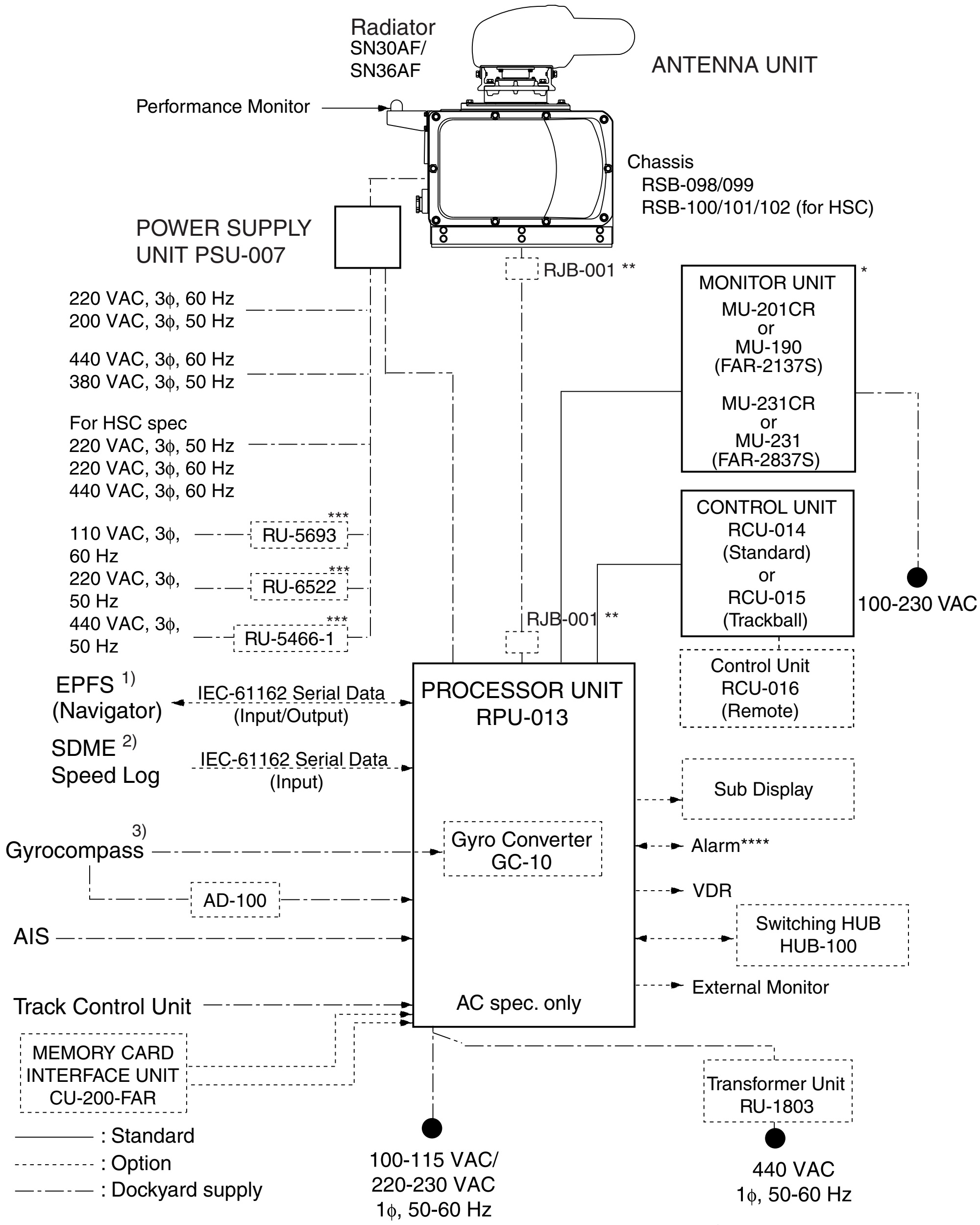
Optional Equipment

Name	Type	Code No.	Remarks
Gyro Converter	GC-10-2	000-080-440	See chapter 4.
Performance Monitor	PM-51	000-081-261	Mandatory for IMO radar

(Continued on the next page.)

Name	Type	Code No.	Remarks	
Transformer Unit	RU-1803	-	For processor unit, 440 VAC → 100 VAC	
	RU-3305	-	For de-icer , 110/115/220/230 VAC → 100 VAC	
	RU-5693	-	For RSB-098/099, 110 V →220 VAC	Not available for HSC
	RU-6522	-	For RSB-098/099, 220 V →200 VAC	
	RU-5466-1	-	For RSB-098/099, 440 V →220 VAC	
Memory Card Interface Unit	CU-200-FAR	000-081-568	W/CP03-27430, See chapter 4.	
External Buzzer	OP03-21	000-030-097		
Control Unit	RCU-016	000-080-299	Remote type, W/FP03-09860	
RAM Card	00RAM08MC-005	004-376-740	8 MB	
DVI-RGB Conversion Kit	OP03-180-1	008-545-590	Mounted at Factory.	
	OP03-180-2	008-536-070	Mounted in field. See chapter 4.	
	OP03-180-3	008-545-610	Mounted in console at factory	
	OP03-180-4	008-545-600	Mounted in console in filed.	
Cable Assy.	XH10P-W-6P L=20M	000-149-748	Between processor and control unit	20 m
	XH10P-W-6P L=30M	000-149-749		30 m
	XH10P-W-5P-A L=10M	000-149-050	Between control units, 10 m	
	XH10P-W-5P-A L=20M	000-149-051	Between control units, 20 m	
	XH10P-W-5P-A L=30M	000-149-052	Between control units, 30 m	
	DVI-D/D S-LINK 10M	000-150-200	Monitor-Processor, 10m	
	S03-9-5	008-206-640	For external radar, 5 m, 8-8P	
	S03-9-10	008-206-650	For external radar, 10 m, 8-8P	
	S03-9-15	008-209-160	For external radar, 15 m, 8-8P	
LAN Cable Kit (with armor)	CP03-28900	000-082-658	FR-FTPC-CY 10 m	Modular connector MPS588-C, 2pcs
	CP03-28910	000-082-659	FR-FTPC-CY 20 m	
	CP03-28920	000-082-660	FR-FTPC-CY 30 m	
Accessories	FP03-09820	008-535-560	Hanger assy. for MU-201CR	
	FP03-09830	008-536-020	Hanger assy. for MU-231CR	
Hand Grip	FP03-09840	008-535-570	For monitor unit	
Dust Cover	03-163-1201	100-307-260	For MU-201CR	
	03-163-2101	100-307-270	For MU-231CR	
Hood	FP03-11500	001-020-090	For MU-201CR	
	FP03-11000	008-571-680	For MU-231CR	
Clamp Plate	OP03-182	008-535-620	For RCU-014	
Flush Mount Kit	FP03-09870	008-535-630	For control unit RCU-014/015/016	
	OP03-198	001-008-050		
Coupling Pedestal	OP03-183	008-535-640	For RCU-014&MU-201CR	
	OP03-184	008-535-650	For RCU-014& MU-231CR	
	OP03-185	008-535-660	For RCU-014	
Desktop Mount Kit	FP03-10201	008-539-530	For CU-200	
Console Mount Kit	FP03-10202	008-539-540	For CU-200	
BNC connector converter	DSUB-BNC-1	000-148-528	For VDR	
Junction Box	RJB-001	-	For more than 100m antenna cable	
Switching Hub	HUB-100	-	See HUB-100 Operator's manual.	
Slim Hood	FP03-11010	001-033-140	For MU-231CR display unit	
	FP03-11510	001-034-390	For MU-201CR display unit	

SYSTEM CONFIGURATION



*: For FAR-2137S-BB, a monitor unit is prepared by user. See page 1-8.
These monitors have been approved by the IMO, MU-190/201CR for CAT2, MU-231/231CR for CAT1. If a different monitor is to be used, its effective diameter must meet the applicable Category requirements:
CAT 1: effective diameter 320 mm or higher, CAT 2: effective diameter 250 mm or higher
Refer to their operator's manuals for details.

Category of Units
Antenna Unit: Exposed to weather
All other units: Protected from weather

**: Used for antenna cable more than 100 m.
***: Not available for HSC spec.
****: Contact output for Alarm
(Load current) 120mA, (Polarity) No.1/2: Normally Close, No.3/4: Normally Open
Serial I/O for alarm is also possible, which complies with IEC 61162-1.

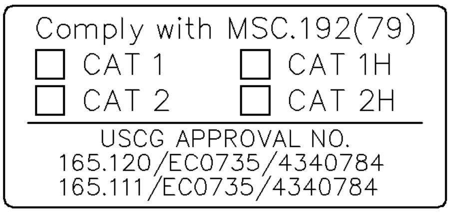
1) Connect the EPFS which is approved in accordance with the requirements of the IMO in resolution MSC. 112(73) is used.
2) Connect the SDME which is approved in accordance with the requirements of the IMO in resolution MSC.96(72) is used.
3) Use the gyrocompass having an update rate that is adequate for the ship's rate of turn.

About the category sticker

This radar meets the requirements in IEC62388 (Marine navigation and radio communication equipment and systems-Shipborne radar-Performance requirements, method of testing and required test results).

Check the appropriate box on the sticker which is pre-attached on the processor unit, according to your radar's specification. Refer to the table shown below to confirm your category.

Category	Radar Type	Antenna rotation speed
CAT 1	FAR-2817, FAR-2827, FAR-2837S, FAR-2827W, FAR-2837SW	Normal speed
CAT 1H	FAR-2817, FAR-2827, FAR-2837S	HSC
CAT 2	FR-2117/BB, FAR-2127, FAR-2127-BB, FAR-2137S, FAR-2137S-BB	Normal speed
CAT 2H	FAR-2117, FAR-2117-BB, FAR-2127, FAR-2127-BB, FAR-2137S, FAR-2137S-BB	HSC



Sticker for Category

1. MOUNTING

NOTICE

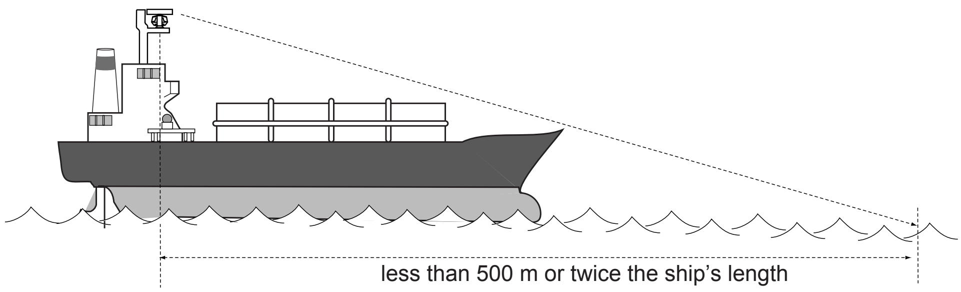
Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

1.1 Antenna Unit

Mounting considerations

- The antenna unit is generally installed either on top of the wheelhouse, on the radar mast, or on a suitable platform. Locate the antenna unit in an elevated position to permit maximum target visibility.
- A line of sight from the antenna unit to the bow of the ship should hit the surface of the sea in not more than 500 m or twice the ship's length, depending which value is smaller, for all load and trim conditions.



- Mount the antenna unit so that any blind sectors caused by objects (mast, etc.) are kept to a minimum. No blind sector should exist in arc of the horizon from right ahead to 22.5° aft of the beam to either side (see Figure 1 below). Also, individual blind sectors of more than 5°, or the total arc of both blind sectors of more than 20°, should not occur in the remaining arc (Figure 2). Note that any two blind sectors separated by 3° or less are regarded as one sector.

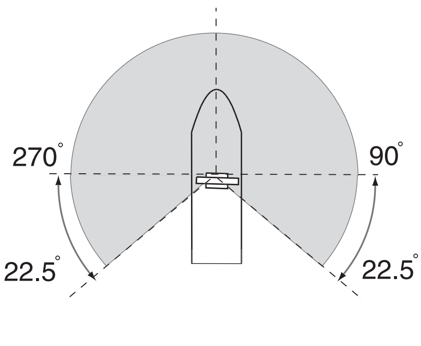


Figure 1

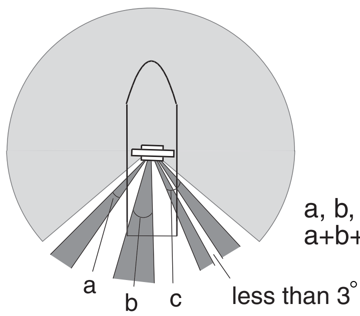
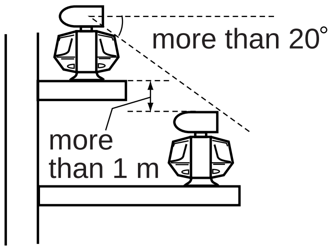


Figure 2

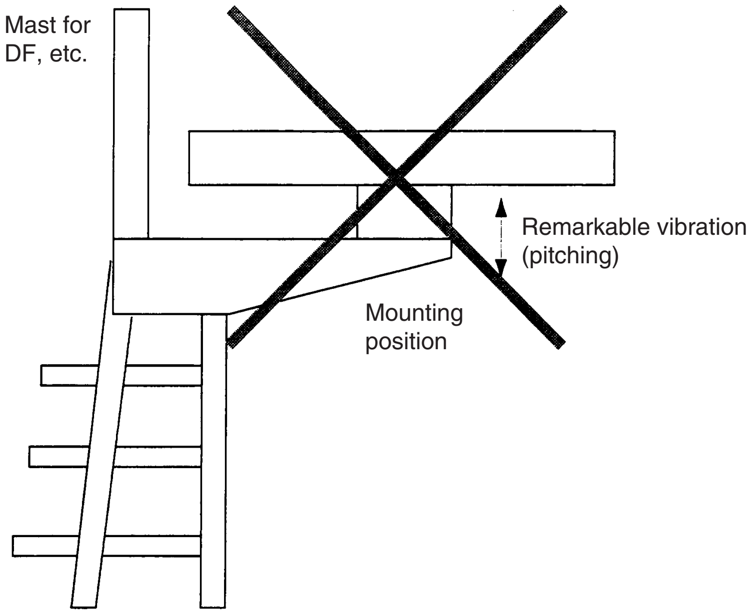
- Install the antenna unit safely away from interfering high-power energy sources and other transmitting radio antenna.
- Keep the lower edge of the antenna unit above the safety rail by 500 mm or more.
- Two antenna units should be mounted as below:

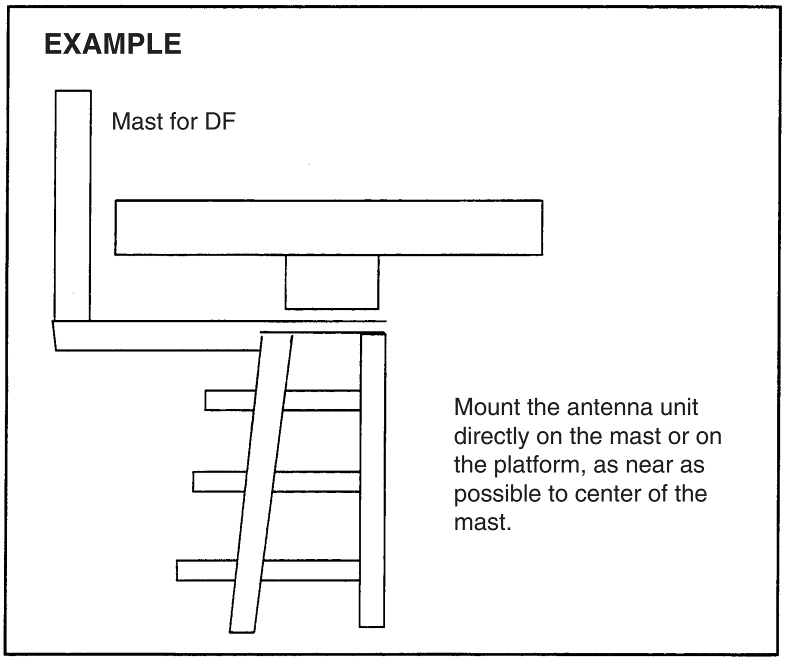


- No funnel, mast or derrick should be within the vertical beamwidth of the antenna unit in the bow direction, especially zero degrees ±5°, to prevent blind sectors and false echoes on the radar picture.
- It is rarely possible to place the antenna unit where a completely clear view in all directions is available. Thus, you should determine the angular width and relative bearing of any shadow sectors for their influence on the radar at the first opportunity after fitting.
- Locate a direction finder antenna clear of the antenna unit to prevent interference to the direction finder. A separation of more than two meters is recommended.
- A magnetic compass will be affected if the antenna unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of the magnetic compass.
- Do not paint the radiator aperture, to ensure proper emission of the radar waves.
- The antenna base is made of cast aluminum. To prevent electrolytic corrosion of the antenna base, use the seal washers and corrosion-proof rubber mat and ground the unit with the ground wire (supplied).
- Deposits and fumes from a funnel or other exhaust vent can adversely affect the aerial performance and hot gases may distort the radiator portion. The antenna unit must not be mounted where the temperature is more than 70°C.
- Leave sufficient space around the unit for maintenance and servicing. See the antenna unit outline drawing for recommended maintenance space.

Installation precaution for S-band antenna unit

If an S-band antenna unit is mounted near the end of a platform to provide sufficient rotation clearance for the radiator, the antenna unit, because of its weight, swings up and down by ship's vibration and rolling. This exerts excessive levels of stress at the base of the radiator, which can damage the radiator. To prevent this, relocate the antenna unit, or if relocation is not possible, reinforce the platform.





Mounting precaution for S-band antenna unit

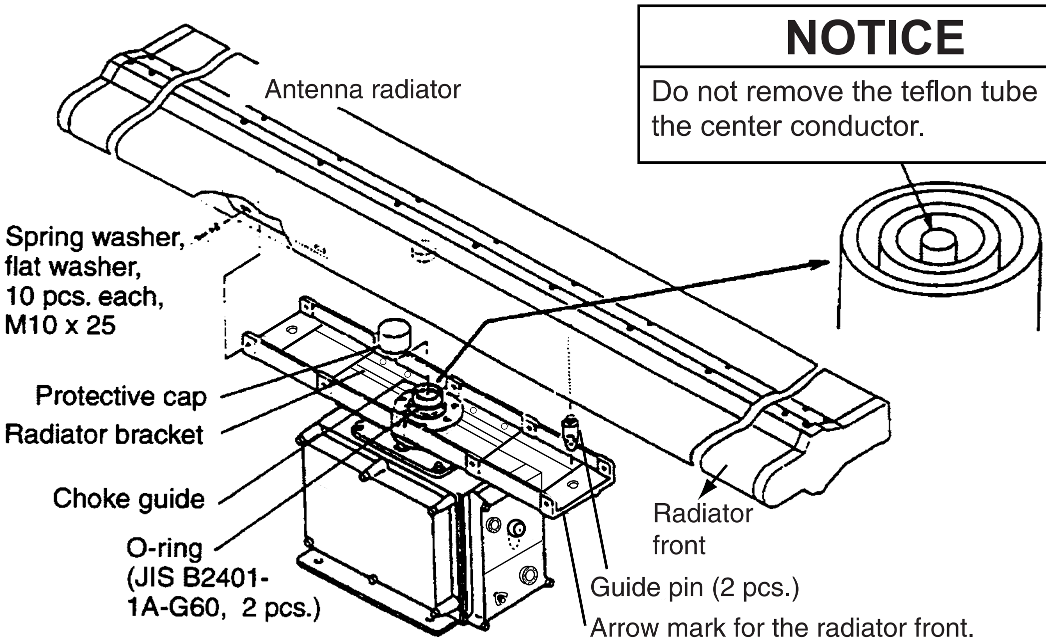
Antenna unit assembling

The antenna radiator and the antenna housing are shipped in separate packages. Assemble them as below. The antenna unit may be assembled before hosting it to the mounting platform. However, do not lift the antenna unit by the radiator.

Antenna unit assembling procedure

1. Screw the guide pins (2 pcs.) in the radiator.
2. Remove the protective cap from the choke guide and radiator.
3. Grease O-ring and set it to the groove of the choke guide.
4. Place the radiator on the radiator bracket. (Radiator direction is shown by the logo on the bracket. If reversely oriented the radiator cannot be set to the bracket.)
5. Loosely fix the radiator to the radiator bracket with hex bolts (M10x25), spring washers and flat washers.
6. Remove the guides pins and tighten hex bolts.

NOTICE
Do not remove the teflon tube from the center conductor.

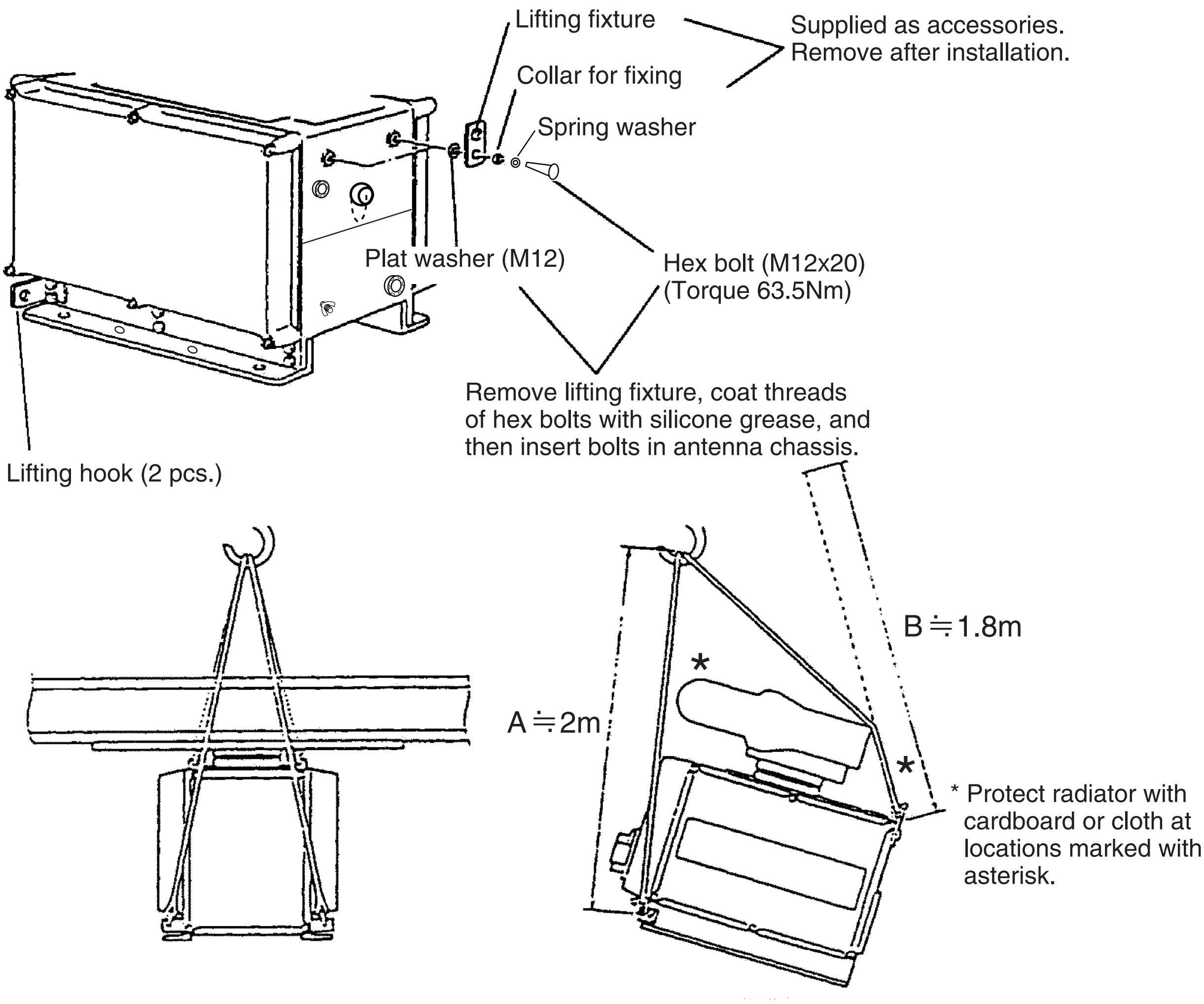


Assembling the radiator bracket

⚠ CAUTION
Be sure to remove the guide pins after fixing the radiator. Injury may result if the guide pins loosen and fall.

How to lift the antenna unit

1. Fix the antenna radiator to the antenna unit chassis as shown on page 1-4.
2. Attach the lifting fixtures and collars as shown below.
3. Position the radiator as shown below and arrange the ropes A and B.

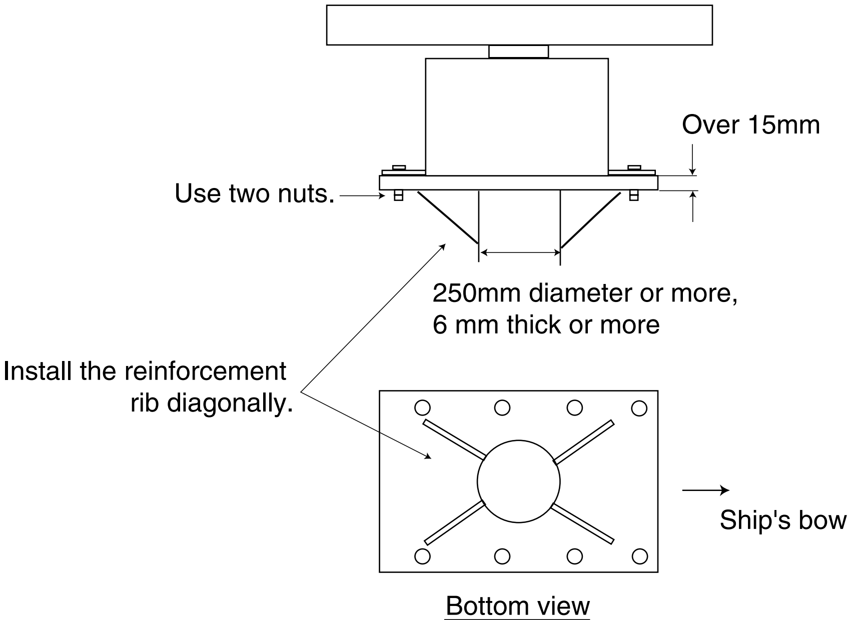


Attachment of lifting fixtures, collar and ropes

Fastening the antenna unit to the mounting platform

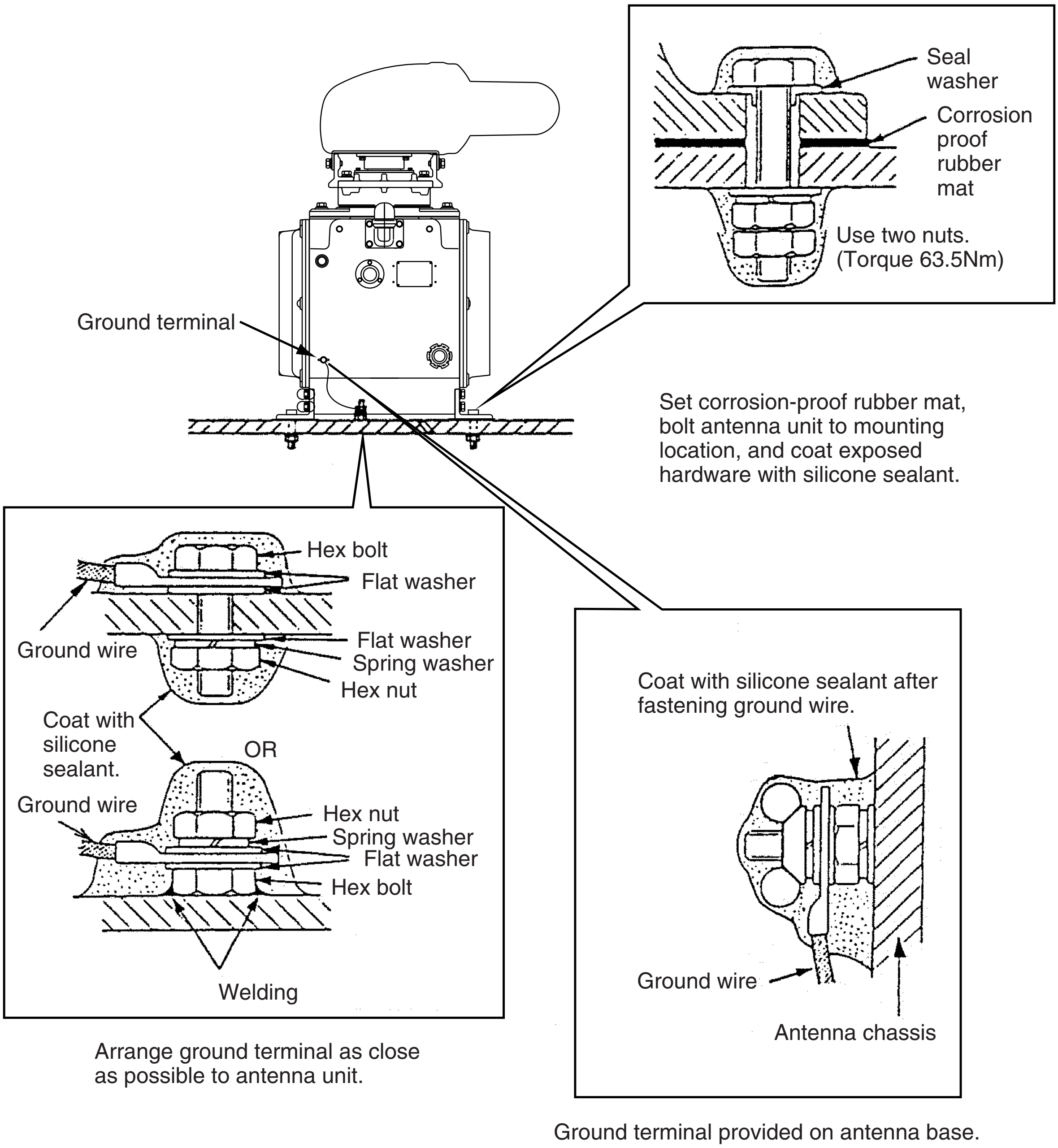
See the figure on the next page for antenna unit mounting.

1. Referring to the antenna outline drawing, drill eight fixing holes of 15 mm in diameter in the radar mast platform or the deck.
   - The diameter of the mast for fixing the antenna unit platform must be over 250 mm.
   - The thickness of the antenna unit platform must be over 15 mm.
   - The reinforcement rib must be installed diagonally as shown below.



Installation of reinforcement ribs

2. Place the corrosion-proof rubber mat (supplied) on the mounting platform.
3. Hoist the antenna unit as shown on page 1-5 and place it on the rubber mat. Orient the cable gland toward the ship’s stern (or port, starboard). Remove the lifting fixtures and collars.
4. Fix the antenna base to the mounting platform with four M12x70 hex bolts, nuts, washers and seal washers (supplied). For the unit with the performance monitor (PM), orient the PM toward the ship’s stern.
5. Arrange the grounding terminal at the nearest grounding spot with the M6x25 hex bolt, nut and washers. Then, fix a ground wire (RW-4747, 340 mm) to the terminal.
6. Connect the other end of the ground wire to the ground terminal of the antenna unit.
7. Coast grounding terminal and fixing bolts on the antenna unit with silicone sealant (supplied).



Mounting of antenna unit

1.2 Monitor Unit

The monitor unit can be flush mounted in a console panel, or mounted on a desktop using the optional accessories. For MU-190/231, see the applicable Operator's Manual(s).

Note: FAR-2137S-BB has no monitor unit. Prepare a suitable one locally.
Recommended monitor: SXGA (1280x1024), aspect ratio 5:4

Mounting considerations

When selecting a mounting location, keep in mind the following points:

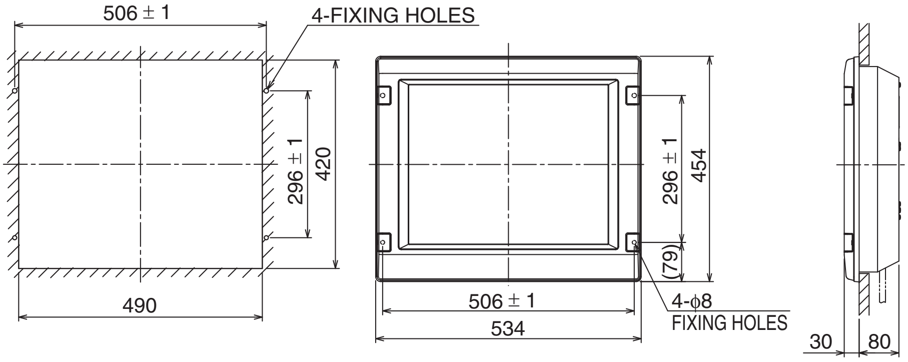
- Select a location where the display unit can be viewed conveniently and where the screen can be viewed while facing towards the bow.
- Select a suitable mounting location considering the applicable distance.
- The optimal viewing distances for the radar display units are: MU-170C: 920 mm, MU-201CR: 1080 mm, MU-231CR: 1200 mm.
- Locate the unit out of direct sunlight and away from heat sources because of heat that can build up inside the cabinet.
- Locate the equipment away from places subject to water splash and rain.
- Leave sufficient space on the sides and rear of the unit to facilitate maintenance.
- A magnetic compass will be affected if the monitor unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

Mounting procedure

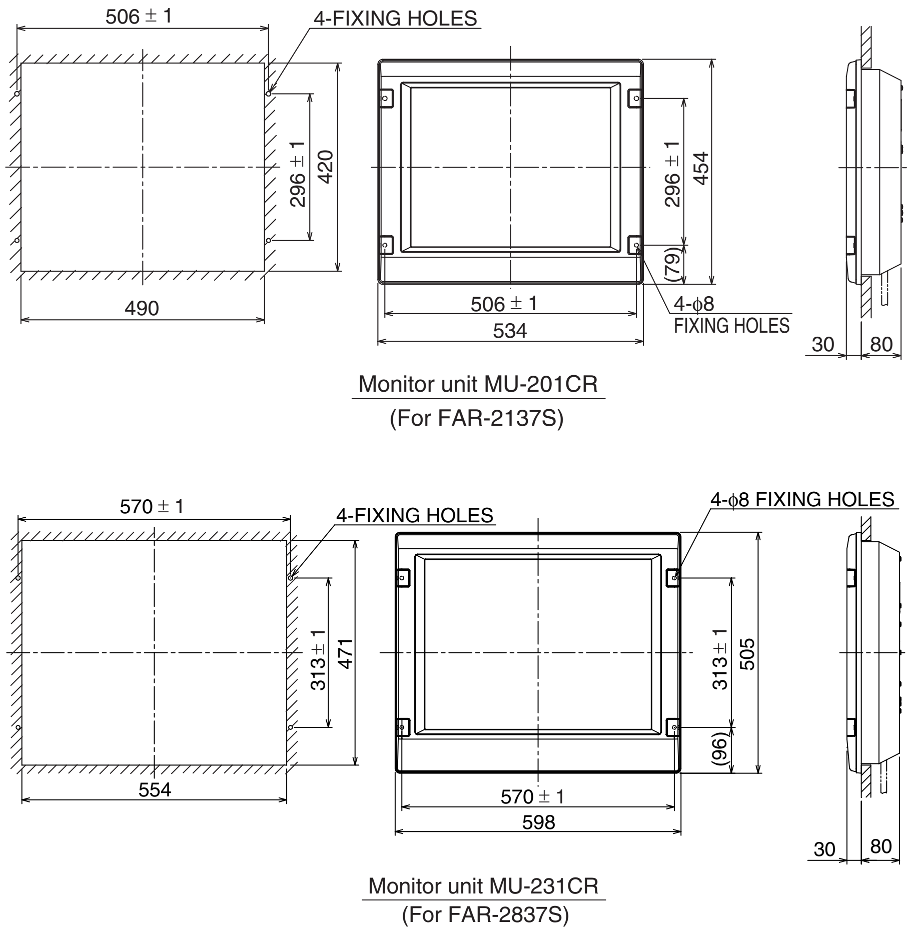
Flush mounting

Follow the procedure below to mount the monitor unit in a console panel.

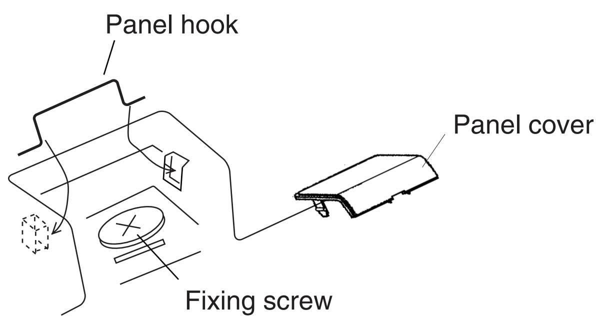
1. Make cutout in mounting location referring to the outline drawing shown below.
2. Insert the monitor unit to the hole and fix it by four tapping screws (6x30).
3. Attach panel hooks near the fixing holes (upper two locations). These are used to pull out the monitor unit from a console panel for servicing.
4. Attach four panel covers to the fixing holes.



Monitor unit MU-201CR
(For FAR-2137S)



Flush mounting of monitor unit



Attaching panel hook and panel cover

Note: If you need to remove the monitor unit from the mounting panel, remove the four panel covers with your fingernail and use two panel hooks supplied as accessories to lift the monitor unit.

Desktop mounting

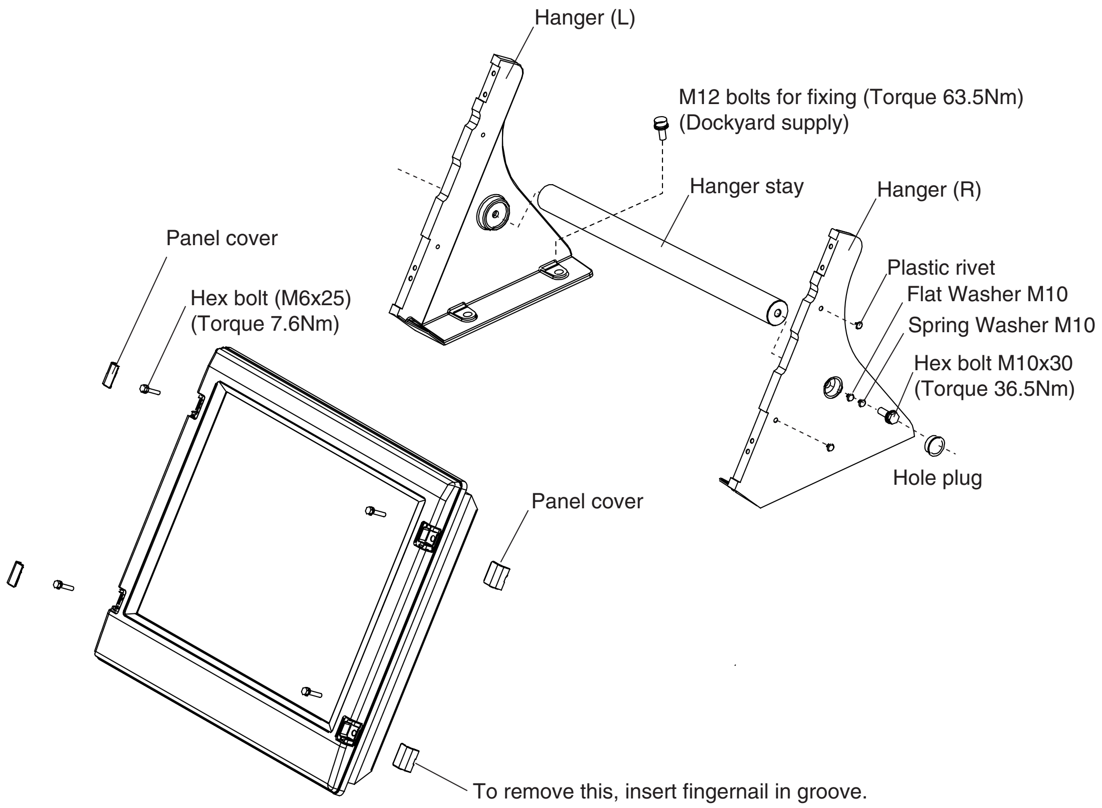
Use the optional accessories to mount the monitor unit on a desktop.

- For FAR-2137S: FP03-09820 (Code No.: 008-535-560)
- For FAR-2837S: FP03-09830 (Code No.: 008-536-020)

Contents of FP03-09820/09830

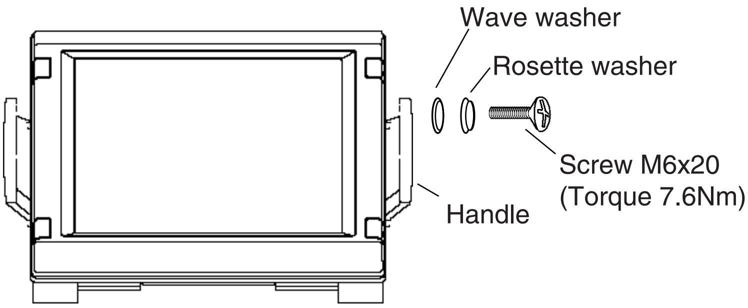
Name	Type	Code No.	Qty	Remarks
Hanger L	03-163-1111	100-305-141	1	
Hanger R	03-163-1112	100-305-181	1	
Hanger stay	03-163-1113	100-305-191	1	For FAR-2137S
	03-163-2071	100-305-371		For FAR-2837S
Hole plug	CP-30-HP-13	000-160-074-10	2	
Plastic rivet	KB-13 Rivet Black	000-570-276-10	4	
Hex. bolt	M6x25	000-162-949-10	4	
Hex. bolt	M10x30	000-162-884-10	2	
Spring washer	M10	000-864-261	2	
Flat washer	M10	000-864-131	2	

1. Assemble two hangers and hanger stay with two hex bolts (M10x30), flat washers and spring washers and cover each hex bolt with hole plug.
2. Fix the above assembly to the mounting location with four hex bolts (M12, dockyard supply).
3. Fasten the monitor unit to the mounting hanger assembly with four hex bolt (M6x25, supplied).
4. Cover each hex bolts with panel cover.
5. Cover each holes for hand grip on the hangers with plastic rivet (4 pcs).



Monitor Unit

The hand grip is optionally available for the desktop mounting monitor unit.



Hood (option)

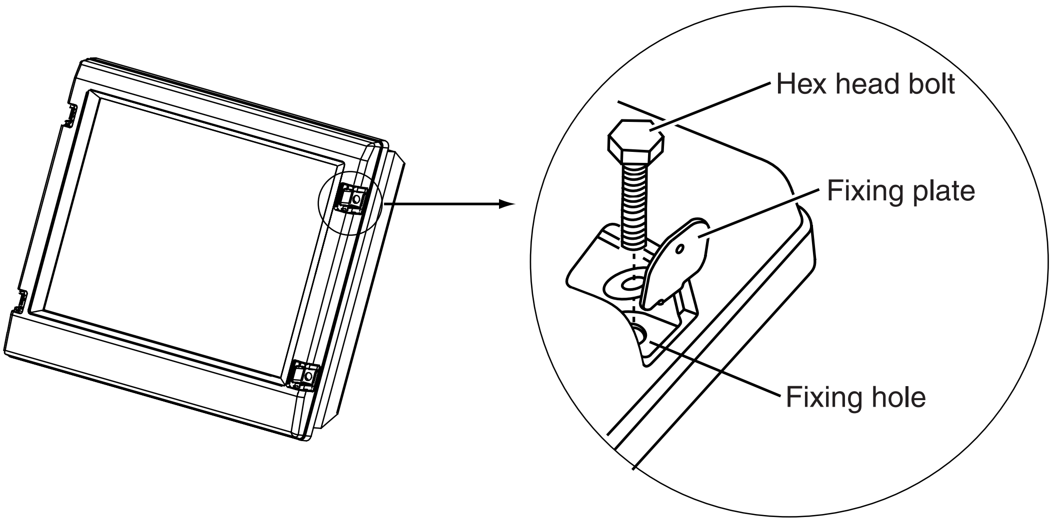
When it is too bright in the daytime, use the optional hood to shade the screen.

- For FAR-2137S: FP03-11500 (Code No.: 001-020-090)
- For FAR-2837S: FP03-11000 (Code No.: 008-571-680)

Contents of hood

Name	Type	Code No.	Qty.	Remarks
Hood (21)	FP03-11501	001-020-120	1	For FAR-2137S
Hood (23)	FP03-11001	008-571-700	1	For FAR-2837S
Fixing plate	03-163-2202-0	100-335-560-10	4	
Screw	M4x10 D=13 US304	000-862-543	4	

1. **Desktop mounting:** Fasten the fixing plates to the fixing holes with the hex head bolts (supplied).
   Flush mounting: Fasten the display unit to the mounting location, and then attach the fixing plates with four self-tapping screws.

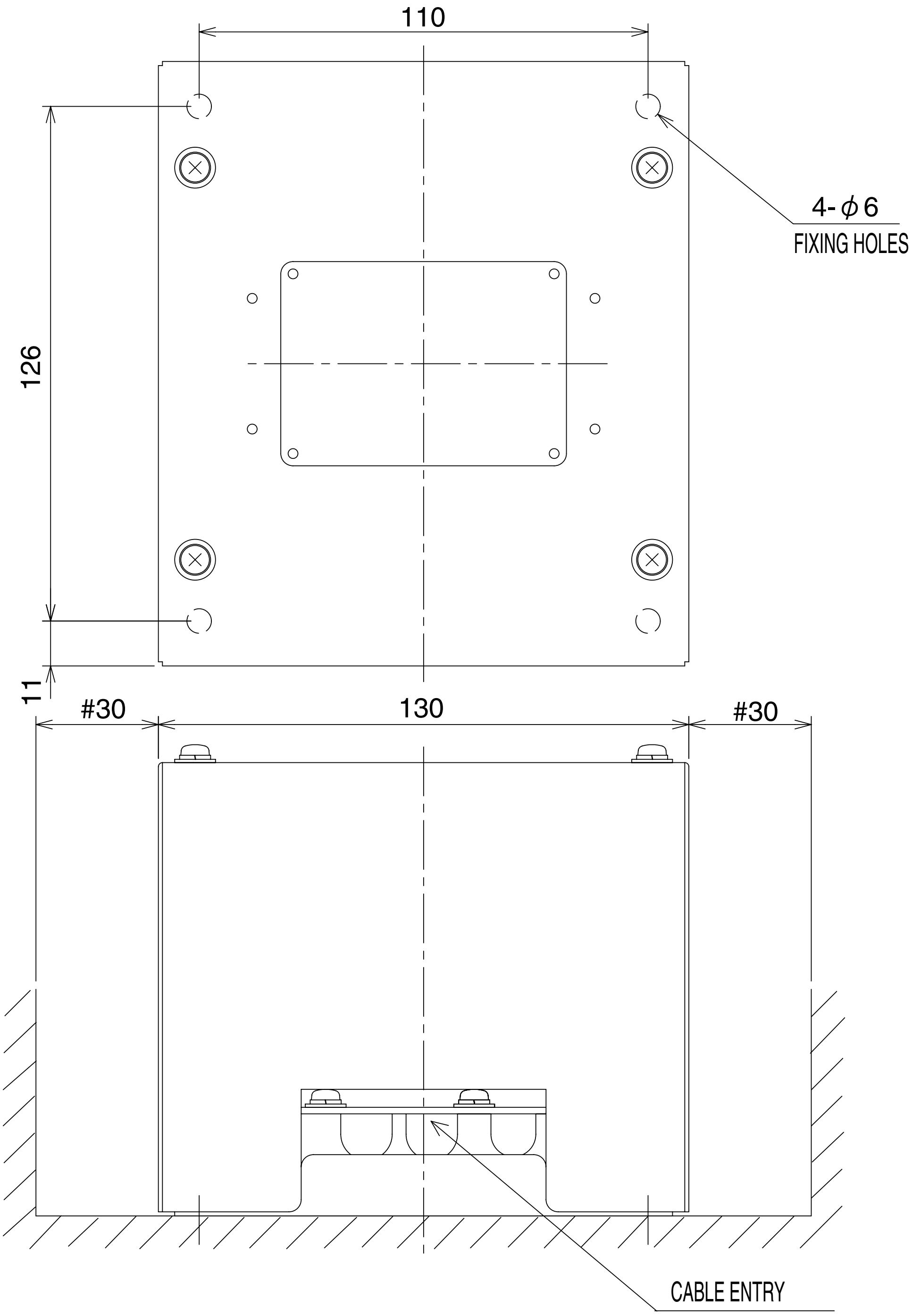


2. Attach the hood to the display unit (the hood is outside of the fixing plates).
3. Fasten the hood to the fixing plates with four screws supplied (M4x10).

1.3 Power Supply Unit

The Power Supply Unit PSU-007 does not contain usual operating controls. Therefore, it can be installed in any recessed place either in vertical or horizontal position. (For the console mount display unit, the PSU-007 can be installed inside the console.) However, select a dry and well-ventilated location and observe the compass safe distance to prevent deviation of a magnetic compass. See page ii.

1. Open the cover of the power supply unit.
2. Fasten the unit to chosen location with four self-tapping screws 5x20.
3. After connecting cables, attach the cover.



1.4 Control Unit

The control unit may be mounted on a tabletop, with or without the KB fixing metal (supplied), which mounts the control unit at an angle.

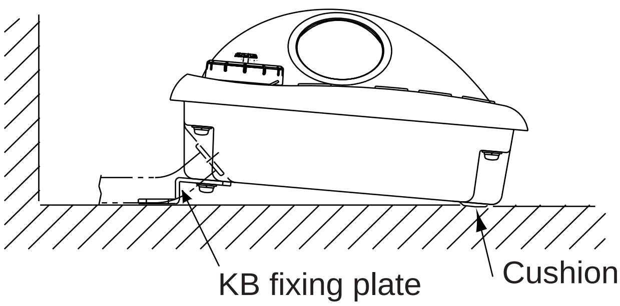
Mounting considerations

When selecting a mounting location, keep in mind the following points:

- Select a location where the control unit can be operated conveniently.
- Locate the unit away from heat sources because of heat that can build up inside the cabinet.
- Locate the equipment away from places subject to water splash and rain.
- Determine the mounting location considering the length of the signal cable between the control unit and the processor unit. (The signal cable comes in lengths of 10 m).
- A magnetic compass will be affected if the control unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

Fixing with KB fixing plate

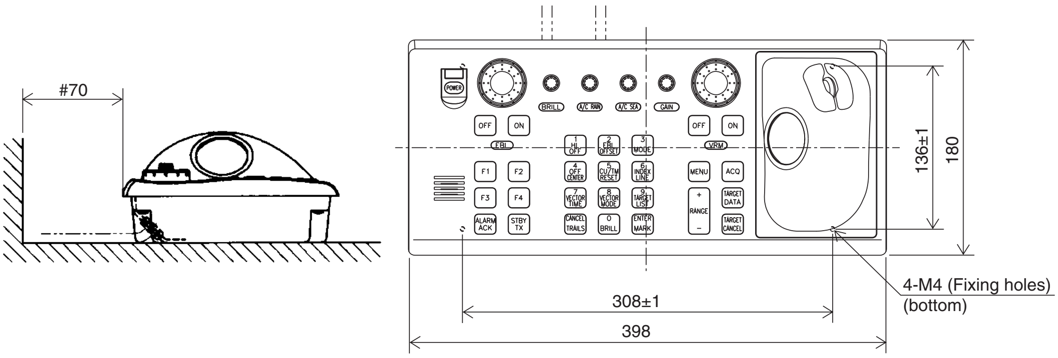
1. Fix the KB fixing plate to the bottom of the control unit.
2. Attach cushions (three for RCU-014, two for RCU-015/016) to the bottom of the control unit as shown below.
3. Fix it to a desired location with self-tapping screws (local supply).



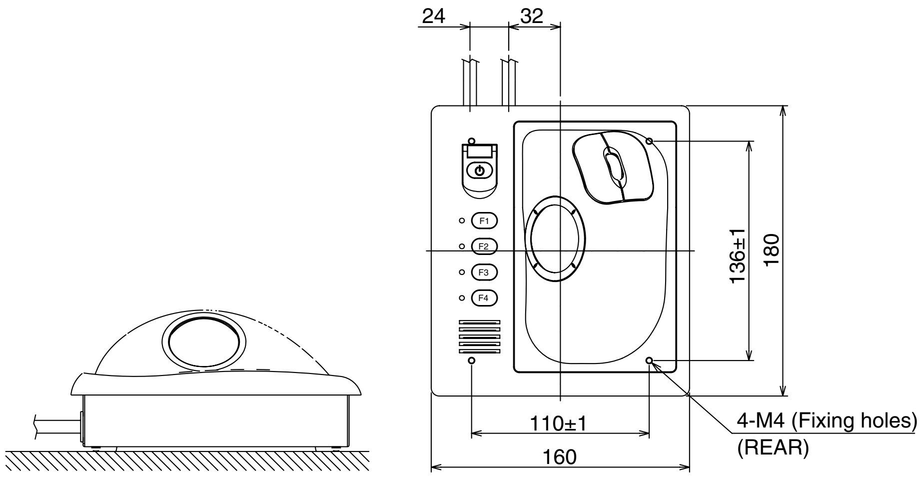
Side view for RCU-014/015/016

Fixing without KB fixing metal

1. Drill four mounting holes of 5 mm diameter referring to the outline drawing at the back of this manual.
2. Fix the control unit with four screws (M4) from under side of the tabletop. (The M4 screws with a sufficient length for the thickness of the tabletop should be provided locally.)



Control Unit RCU-014



RCU-015/016

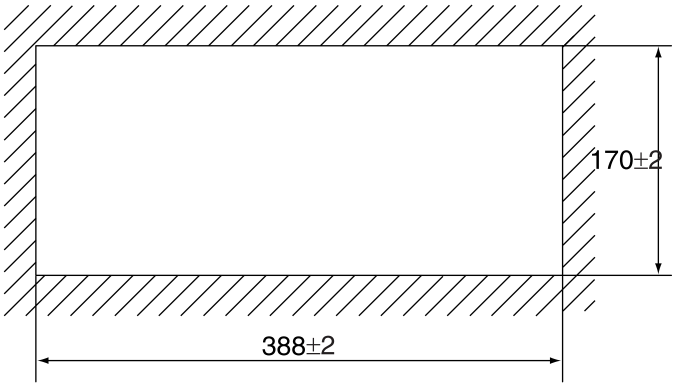
Flush mounting

Use the optional flush mount kit FP03-09870 to mount the control unit RCU-014, RCU-015 and/or RCU016 to a console panel.

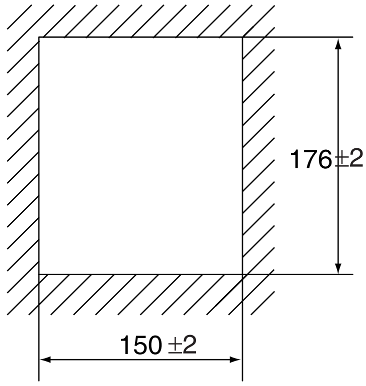
Name: Flush mount kit
Type: FP03-09870
Code No.: 008-535-630

No.	Name	Type	Code No.	Qty
1	Mount plate	03-163-7531	100-306-261	4
2	Hex nut	M5	000-863-108	4
3	Wing screw	M5X40	000-162-682-10	4
4	Pan head screw	M4X12	000-163-192-10	4

1. Prepare a cutout in the mounting location as shown in the figure below.

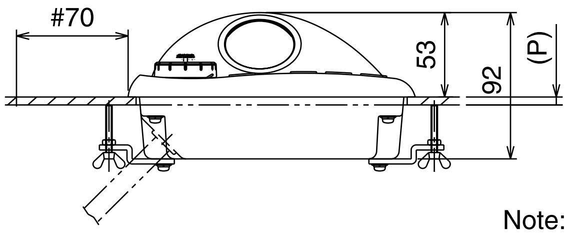


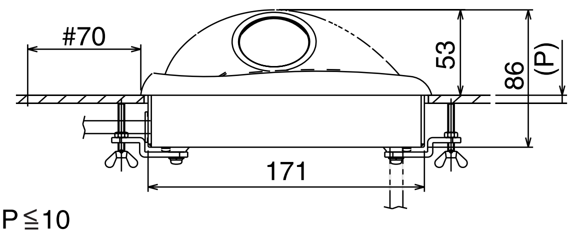
For RCU-014



For RCU-015 and RCU-016

2. Set the control unit to the cutout.
3. Attach the mounting plate to the control unit with four screws from the rear side.
4. Screw the wing screw to each mounting plate and then insert hex bolt to each wing screw.
5. Fasten each wing screws and then fasten the hex nuts as shown in the figure below.



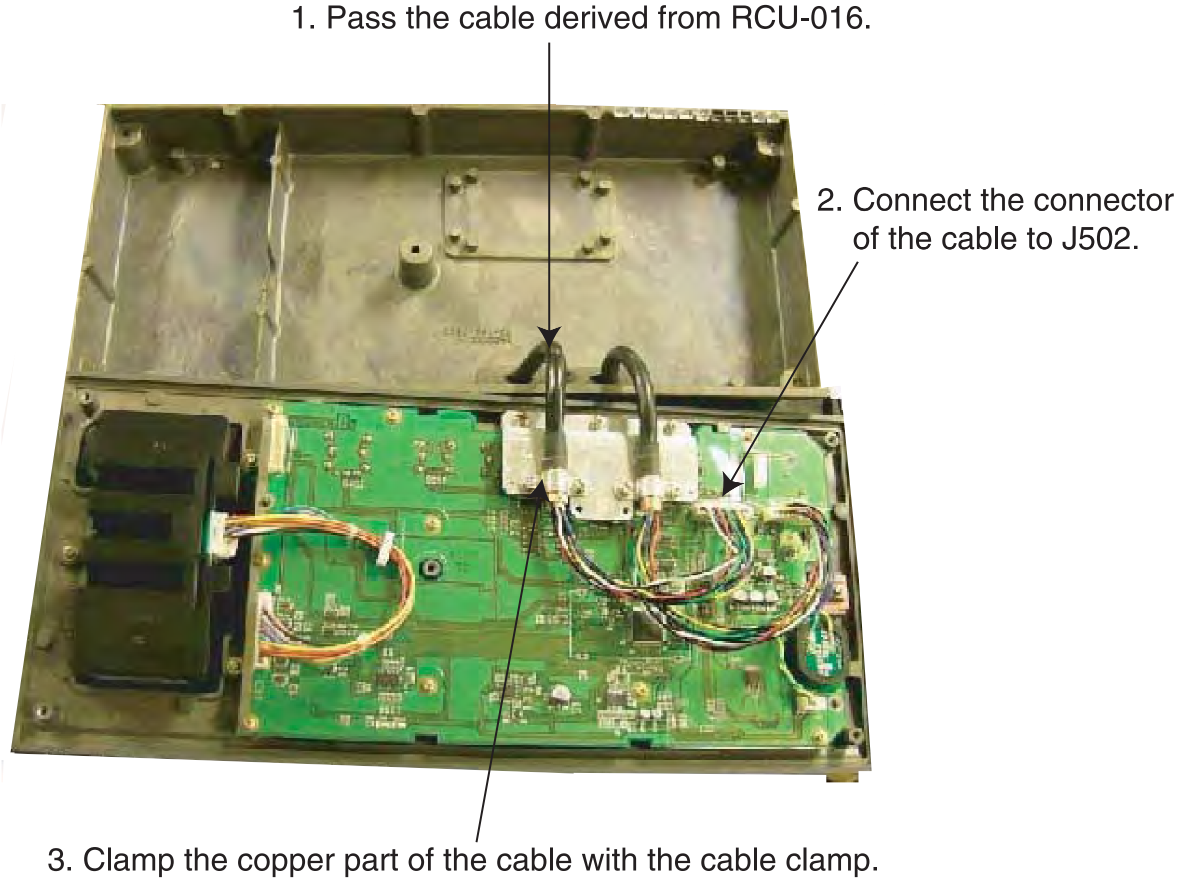


Note: P≦10

RCU-014

RCU-015/RCU-016

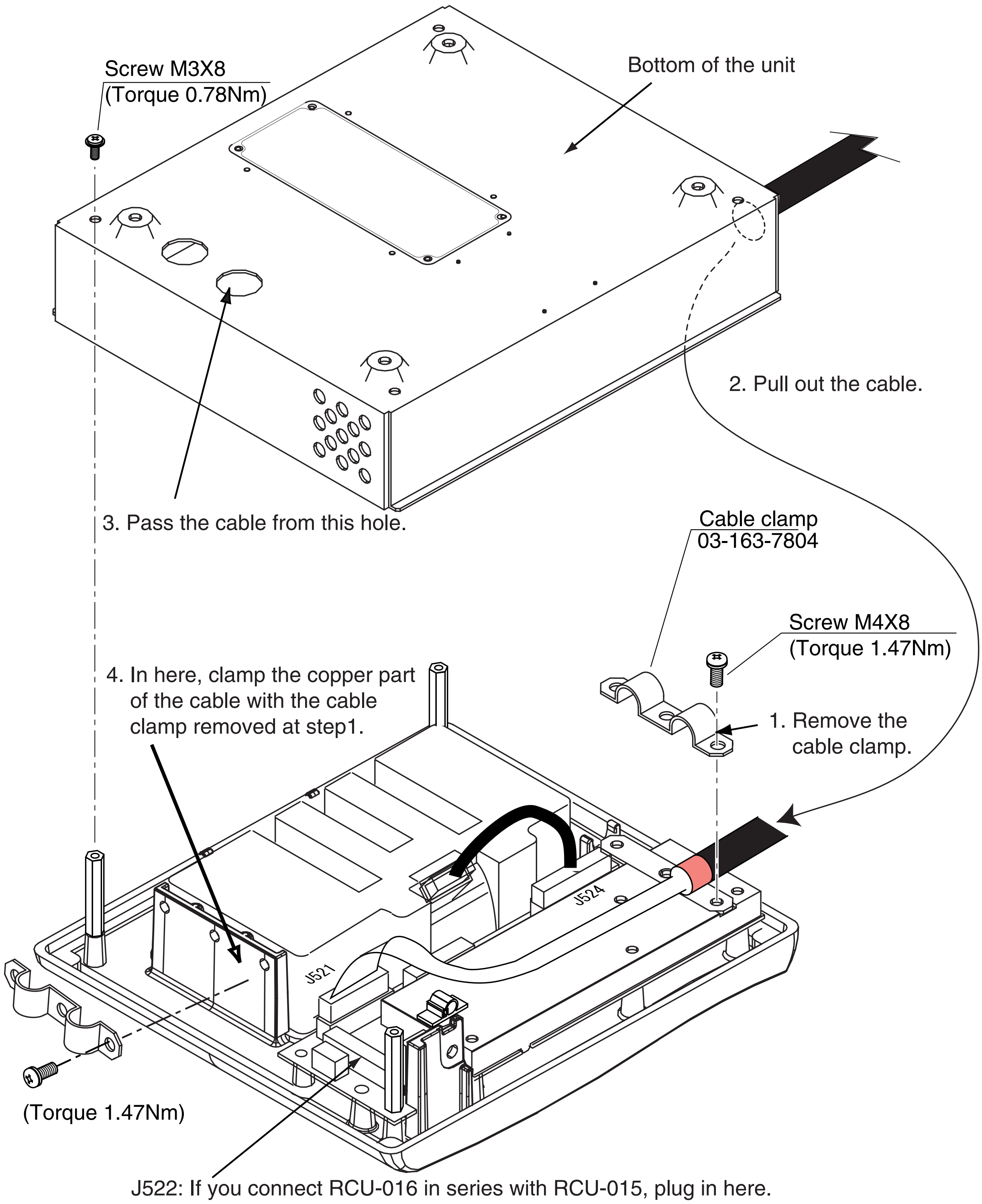
To connect RCU-016 in series with RCU-014



Inside of RCU-014

To change the cable entry

To change the cable entry from the side (default) to the bottom, modify the unit as shown below.



RCU-015/016: Changing cable entry

1.5 Processor Unit

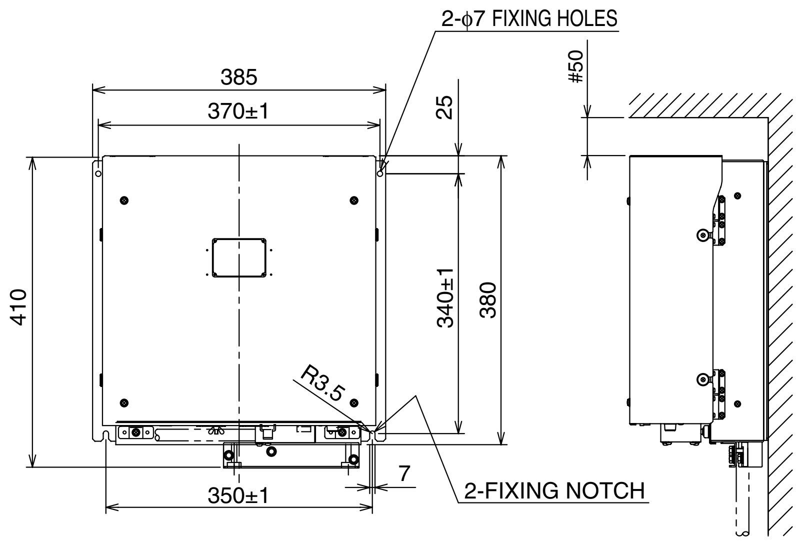
Mounting considerations

When selecting a mounting location, keep in mind the following points:

- Locate the processor unit away from heat sources because of heat that can build up inside the cabinet.
- Locate the equipment away from places subject to water splash and rain.
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- A magnetic compass will be affected if the processor unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

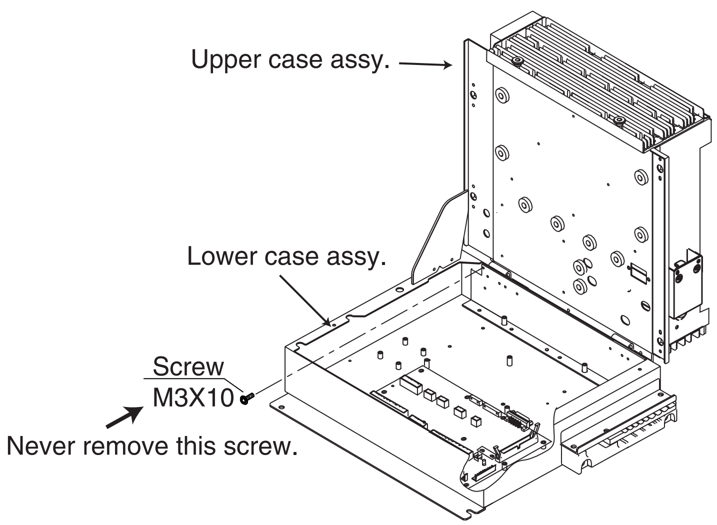
Mounting procedure

1. Fix the unit with four M6 bolts, or self- tapping screws.



Floor mounting or bulkhead mounting

Note: If you fix the unit, cable entry upside, never remove the screw M3x10 that joints the upper case assy. and lower case assy. of the processor unit.



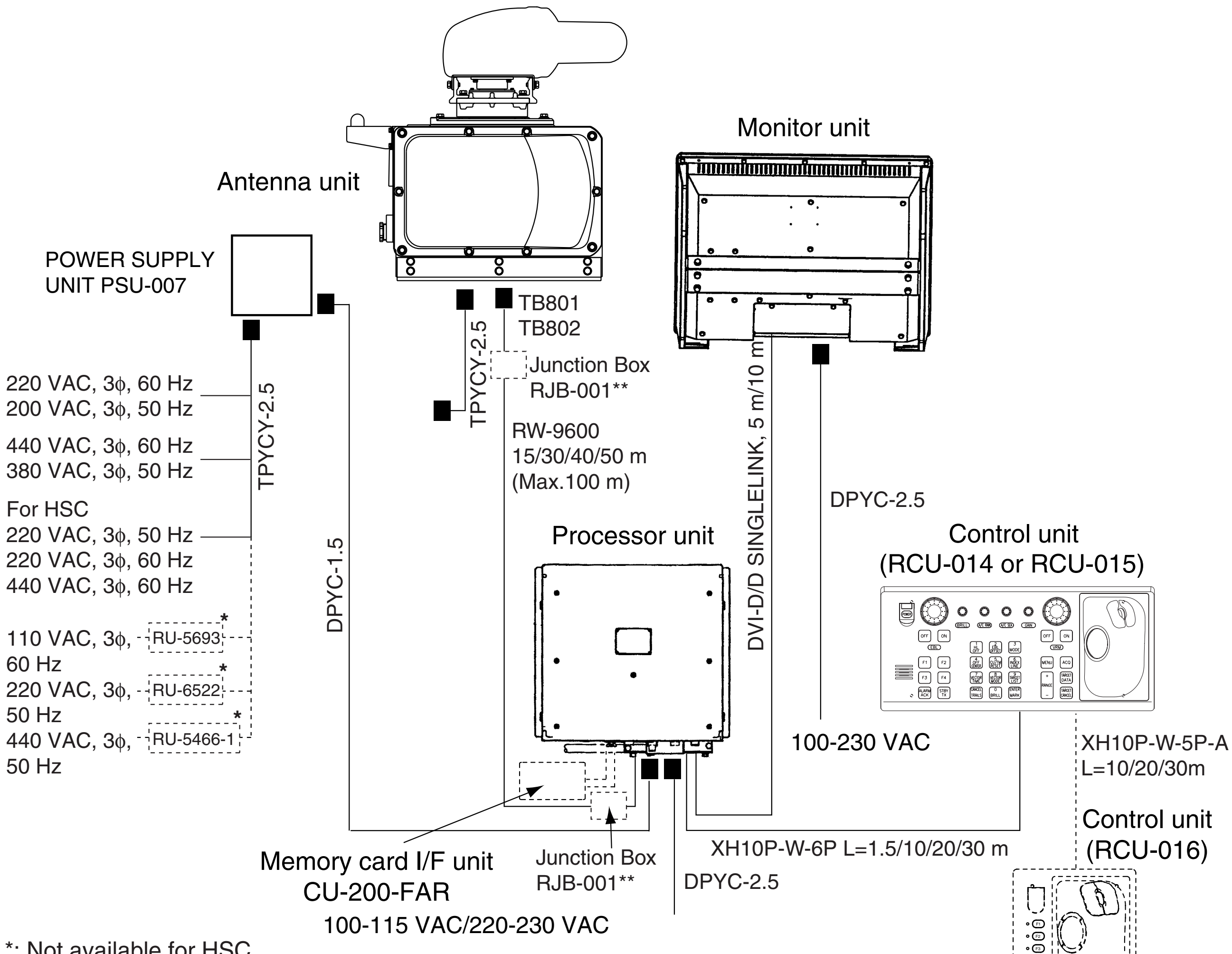
Processor unit

2. WIRING

Wiring consideration

- To lessen the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment (radars, transmitting radio antennas, etc.) Also avoid running the cable in parallel with power cables. When crossing with other cable, the angle should be 90° to minimize the magnetic field coupling.
- The signal cable run between the antenna and processor units is available in lengths of 15 m (standard), 30 m and 50 m. Whatever length is used it must be unbroken; namely, no splicing allowed. Use the signal cable as short as possible to minimize attenuation of the signal.
- The radar should be connected to an emergency power source, as required by SOLAS II-1.

2.1 Interconnection



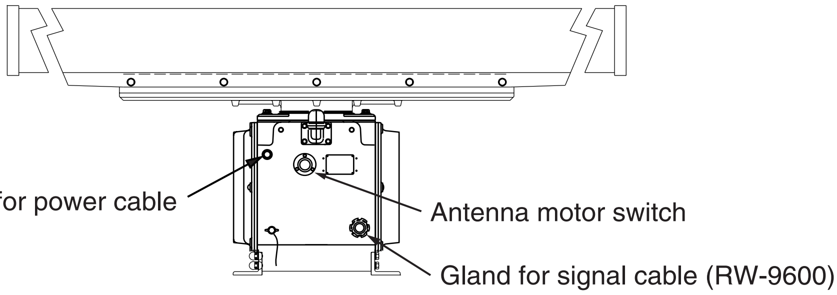
*: Not available for HSC

**: If the length of the antenna cable is more than 100m, use Junction box RJB-001. However, the maximum length is 300m.

■ : Cable requires fabrication

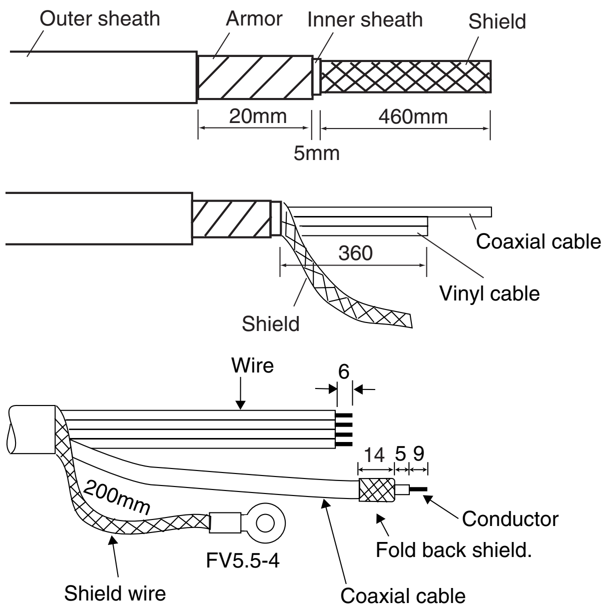
Standard Interconnection

2.2 Antenna Unit

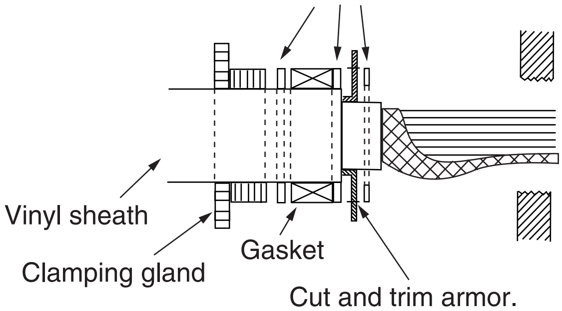


Antenna unit, bow view

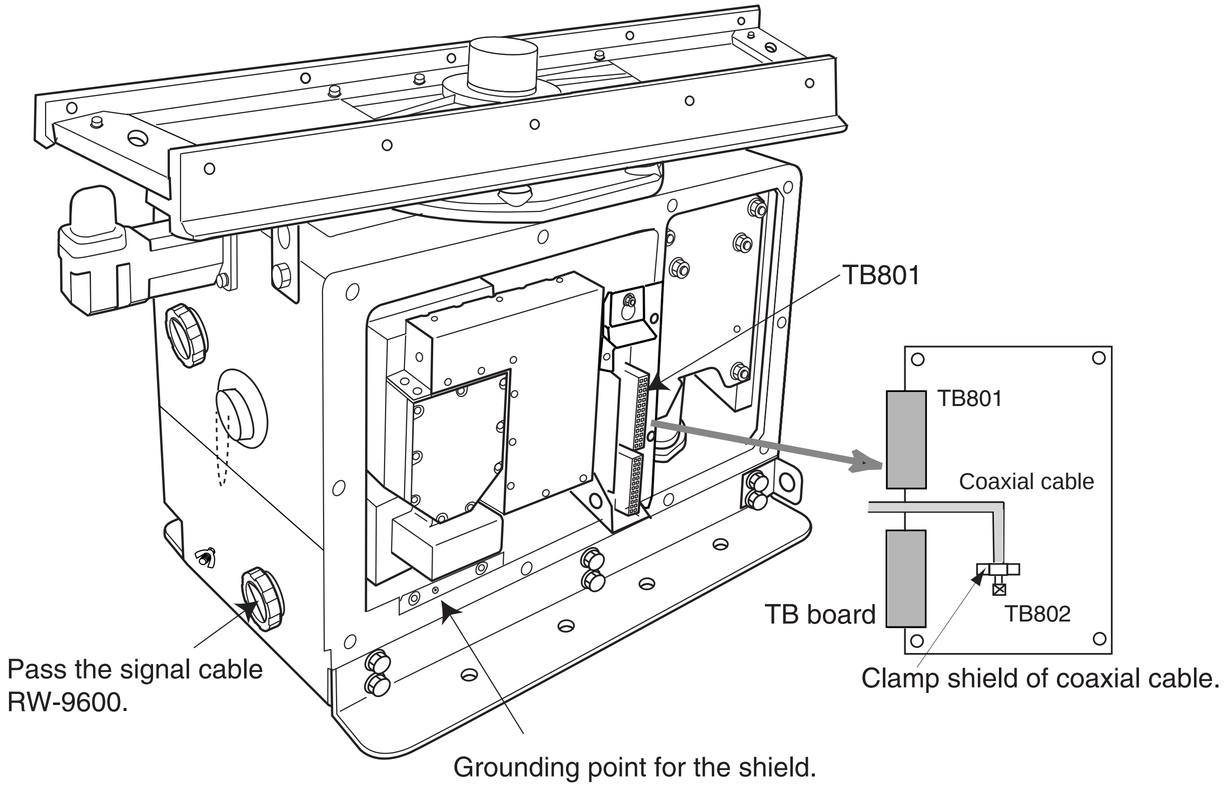
1. Open the right side cover on the antenna unit with the hex wrench.
2. Unfasten the cable gland for the signal cable and remove the gasket, flat washers and blind lid.
3. Fabricate the signal cable RW-9600 as follows.
    a) Remove the outer sheath, armor and inner sheath as shown right.
    b) Unravel the shield to expose the wires in the inner layer.
    c) Shorten each core considering its location on the terminal board TB801.
    d) Trim each wire (except coaxial wire) considering its location on the terminal board.
    e) Trim the shield leaving 200 mm and attach crimp-on lug FV5.5-4.
    f) Remove insulation of each wire by about 6 mm.
    g) Fabricate the coaxial cable as shown right.



4. As shown in the figure below, slide the clamping gland, flat washer, gasket and flat washer on the signal cable.
5. Fold back armor and pass the flat washer as shown in the figure below. Cut and trim the armor around the flat washer.

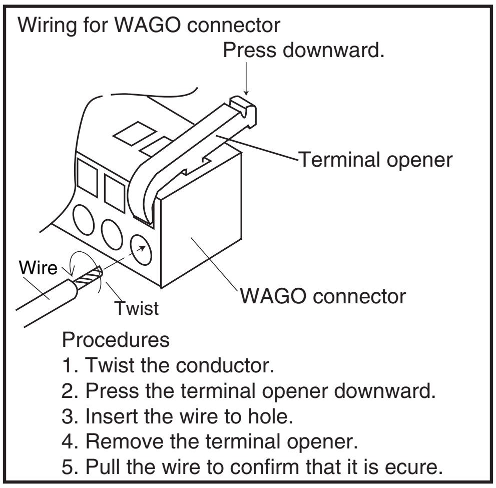


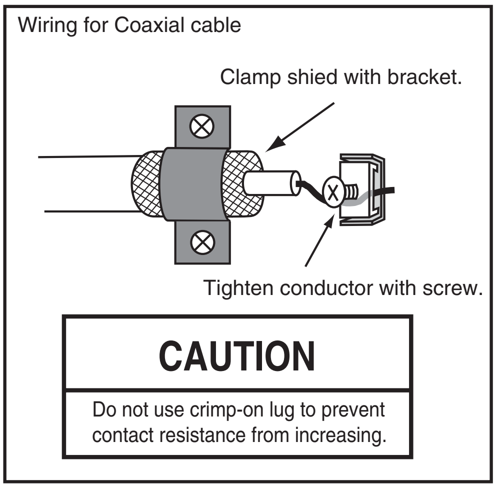
Passing clamping gland, washers and gasket on the signal cable



Antenna unit, port side view

6. Confirm that armor is grounded between two flat washers.
7. Coat the screw part of the clamping gland with silicone sealant and tighten it.
8. Using the opener, insert each core (except coaxial cable) to appropriate connector plug on the TB801.
9. Loosen two screws and slide the TB board assembly upward and pull out it.
10. Connect the coaxial cable to TB802 on the TB board and clamp the shield with the cable clamp on the TB board.

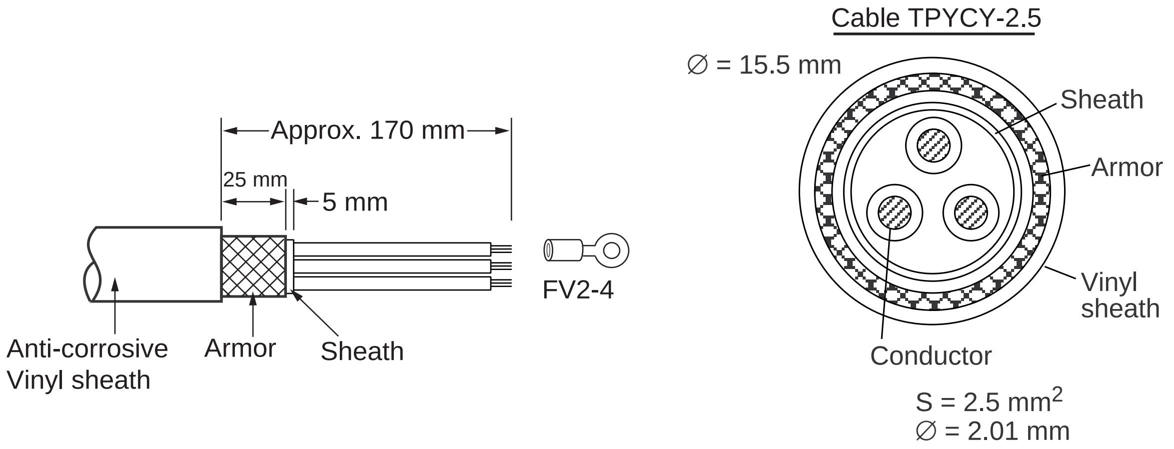




11. Remount the TB board assembly.
12. Connect the shield wire to the grounding point as shown in the figure above.
13. Seal the cable gland with putty.

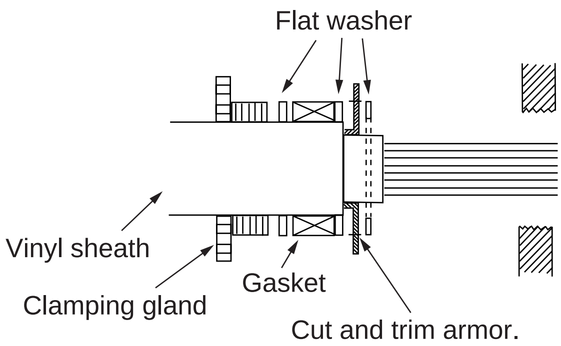
Fabricating power cable TPYCY-2.5

1. Open the left side cover on the antenna unit with the hex wrench.
2. Fabricate the cable as shown below. Use TPYCY-2.5 (Japan Industry Standard) cable or equivalent.



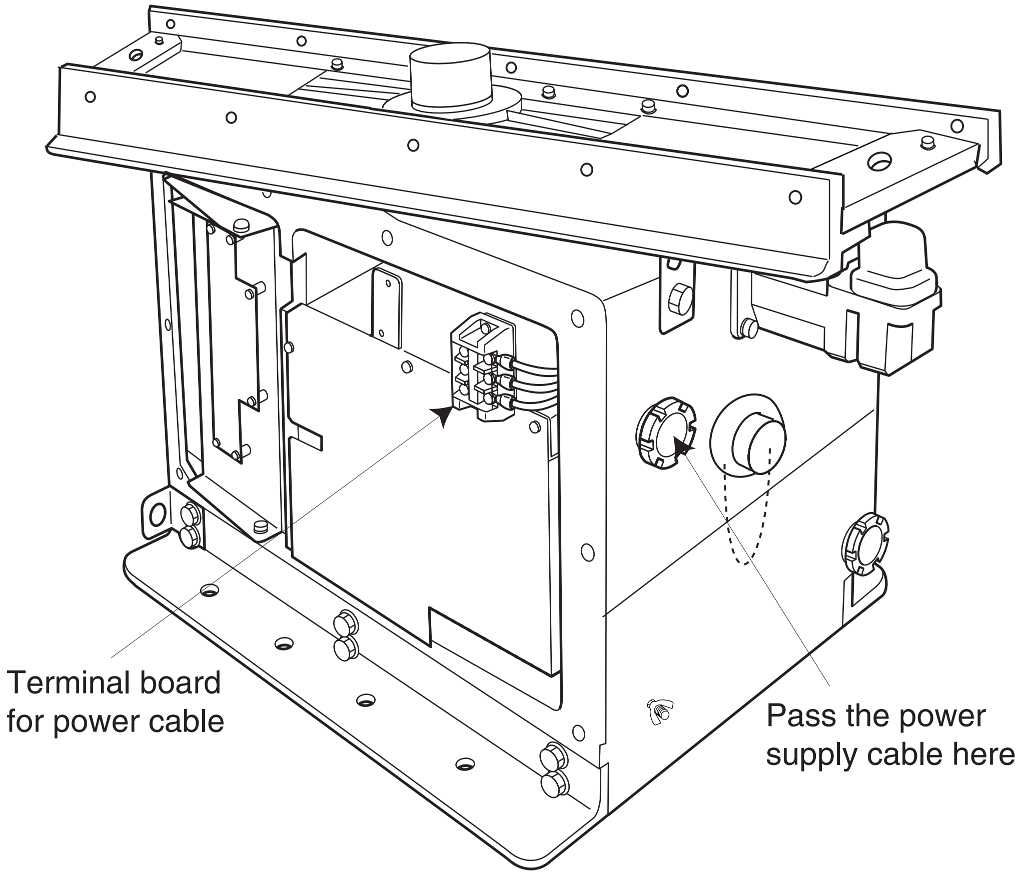
Fabricating the power cable TPYCY-2.5

3. At the power cable gland on the antenna unit, unfasten the clamping gland and remove gasket, flat washers and blind lid.
4. As shown in the figure below, slide the clamping gland, washers and gasket onto the power cable. Fold back the armor by 5 mm, and then pass it through the two flat washers.



Passing clamping gland, washers and gasket on power cable TPYCY-2.5

5. Coat the screw part of the clamping gland with silicone sealant and tighten it.
6. Pass the power cable behind the terminal block, and then pass it through the locking wire saddle.
7. Fix the crimp-on-lug FV2-4 (blue) to each conductor.



Antenna unit, left view

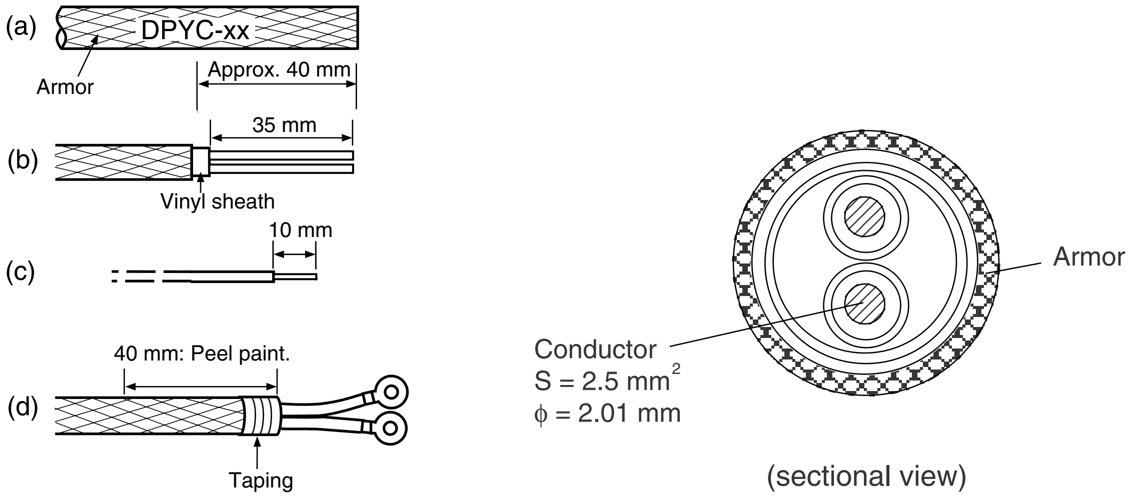
8. Connect crimp-lug to the terminal block referring to the interconnection diagram.
9. Attach the cover (torque: 7.65 N· m).
10. Seal the cable gland with putty.

2.3 Monitor Unit

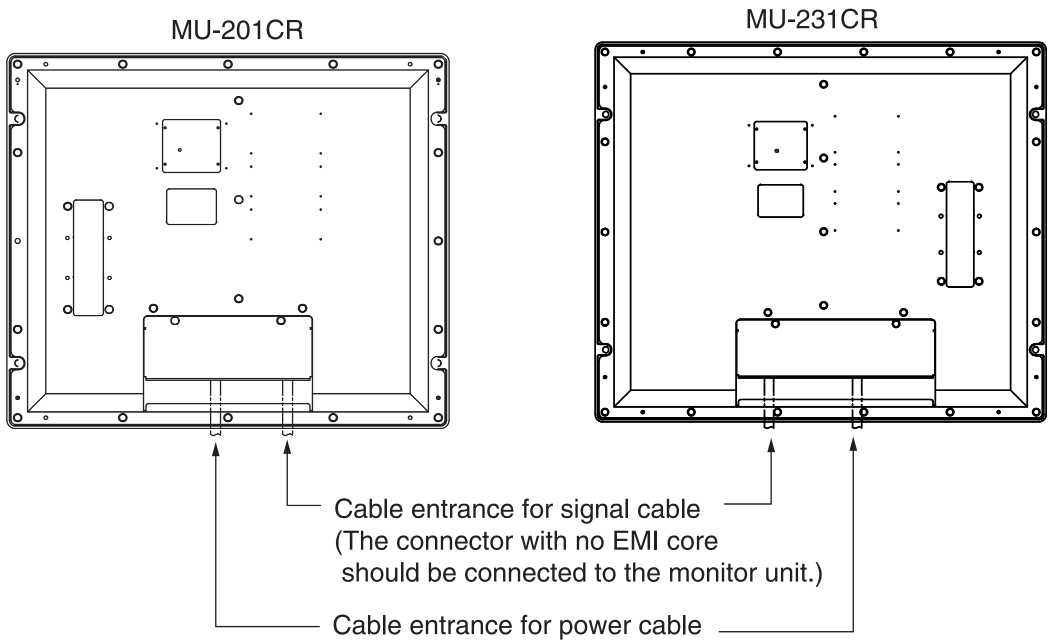
Two cables are terminated at the display unit: the signal cable from the processor unit (5 m or 10 m cable) and the power cable from the ship's mains. The signal cable comes with a connector preattached to it for connection to the display unit. Fabricate the power cable as below. Use DPYC-2.5 (Japan Industry Standard) cable or the equivalent. For MU-190/231, see the applicable Operator's Manual(s).

Fabricating the power cable

1. Cut armor of the cable by 40 mm.
2. Cut vinyl sheath by 35 mm.
3. Remove insulation of wires by about 10 mm. Fix crimp-on lugs to the conductors.
4. Peel paint of the armor by 40 mm.
5. Cover the end of armor with vinyl tape.



Fabricating power cable DPYC-2.5



Monitor unit (rear panel)

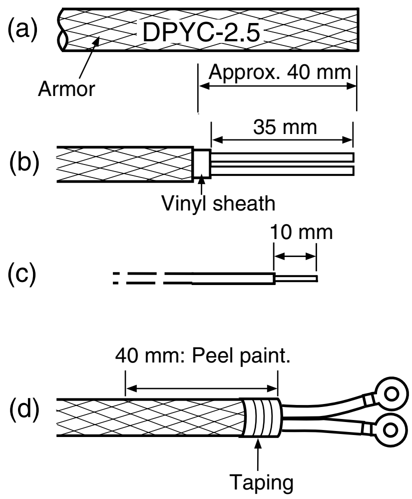
2.4 Processor Unit

Four cables are terminated at the processor unit: the antenna unit cable, display unit cable, control unit cable and the power cable. Cables other than the power cable come with a connector preattached to them for connection to the processor unit. Fabricate the power cable as below. For the power cable, use DPYC-2.5 (Japan Industry Standard) or the equivalent.

Note: Pass the AC line through a double-contact breaker (shipyard supply).

Fabricating the power cable

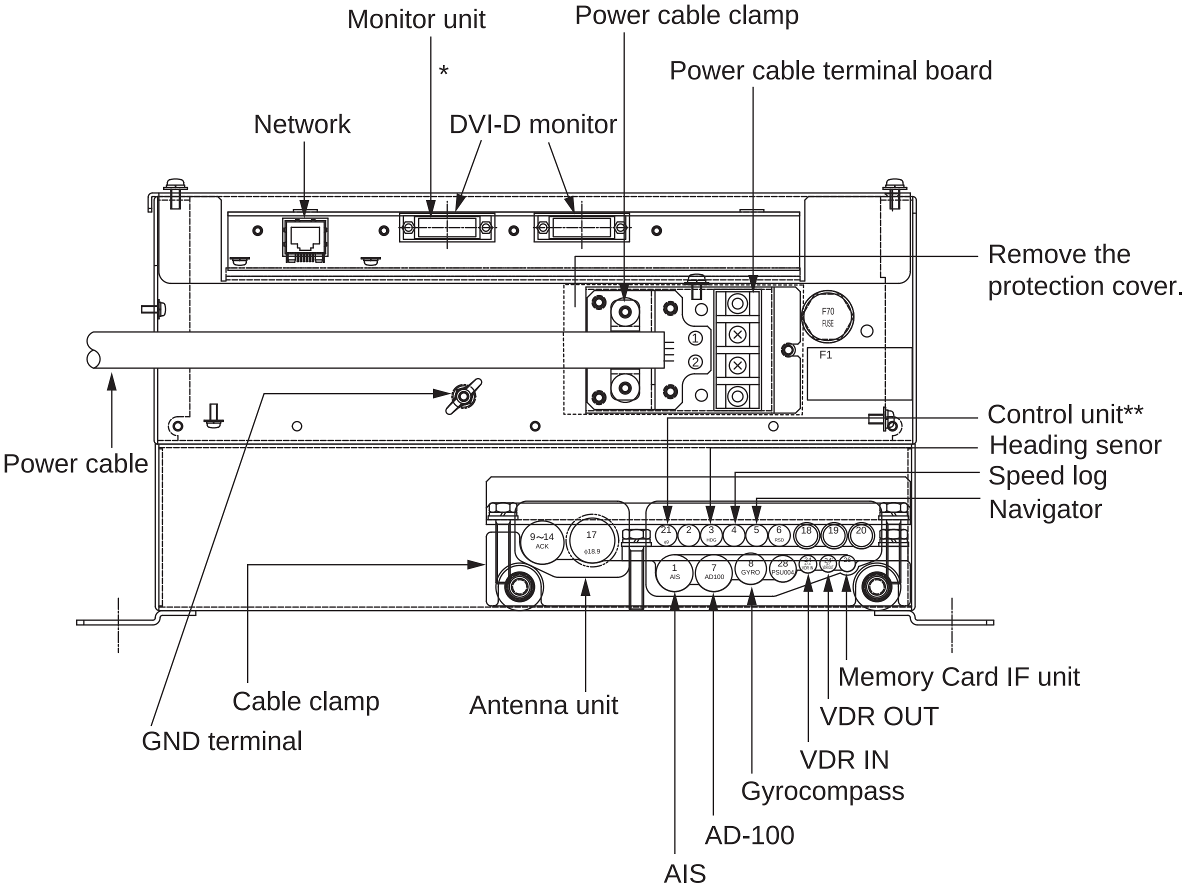
1. Cut armor of the cable by 40 mm.
2. Cut vinyl sheath by 35 mm.
3. Remove insulation of wires by about 10 mm. Fix crimp-on lugs to the cores.
4. Peel paint of the armor by 40 mm.
5. Cover the end of armor with vinyl tape.



Fabricating power cable DPYC

Connection of cables

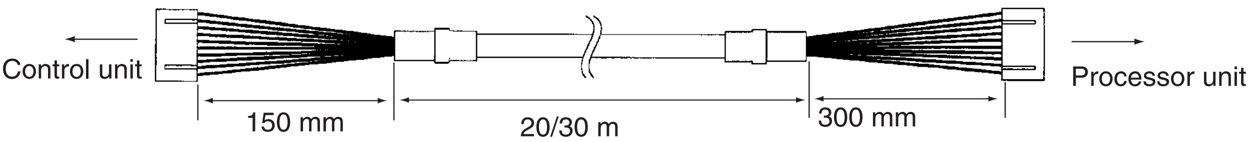
The power cable is connected to the terminal board on the rear panel and the signal cable from the Monitor unit is connected to the DVI-D connector. Other cables are connected to the printed circuit board 03P9342.



Processor unit

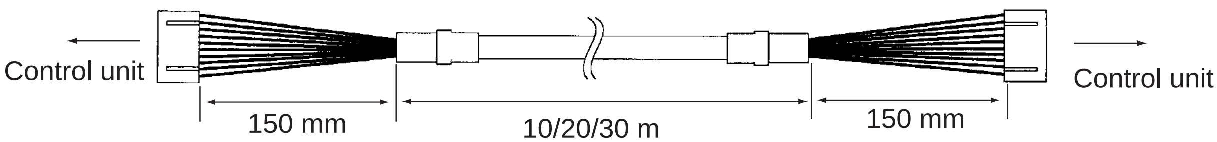
*: The connector side which EMI core is attached should be connected to the processor unit.

**: The configuration of optional cables between the processor unit and the control unit is as follows. Note that the cable fabrication for each end is different.



Cable XH10P-W-6P L=20/30M

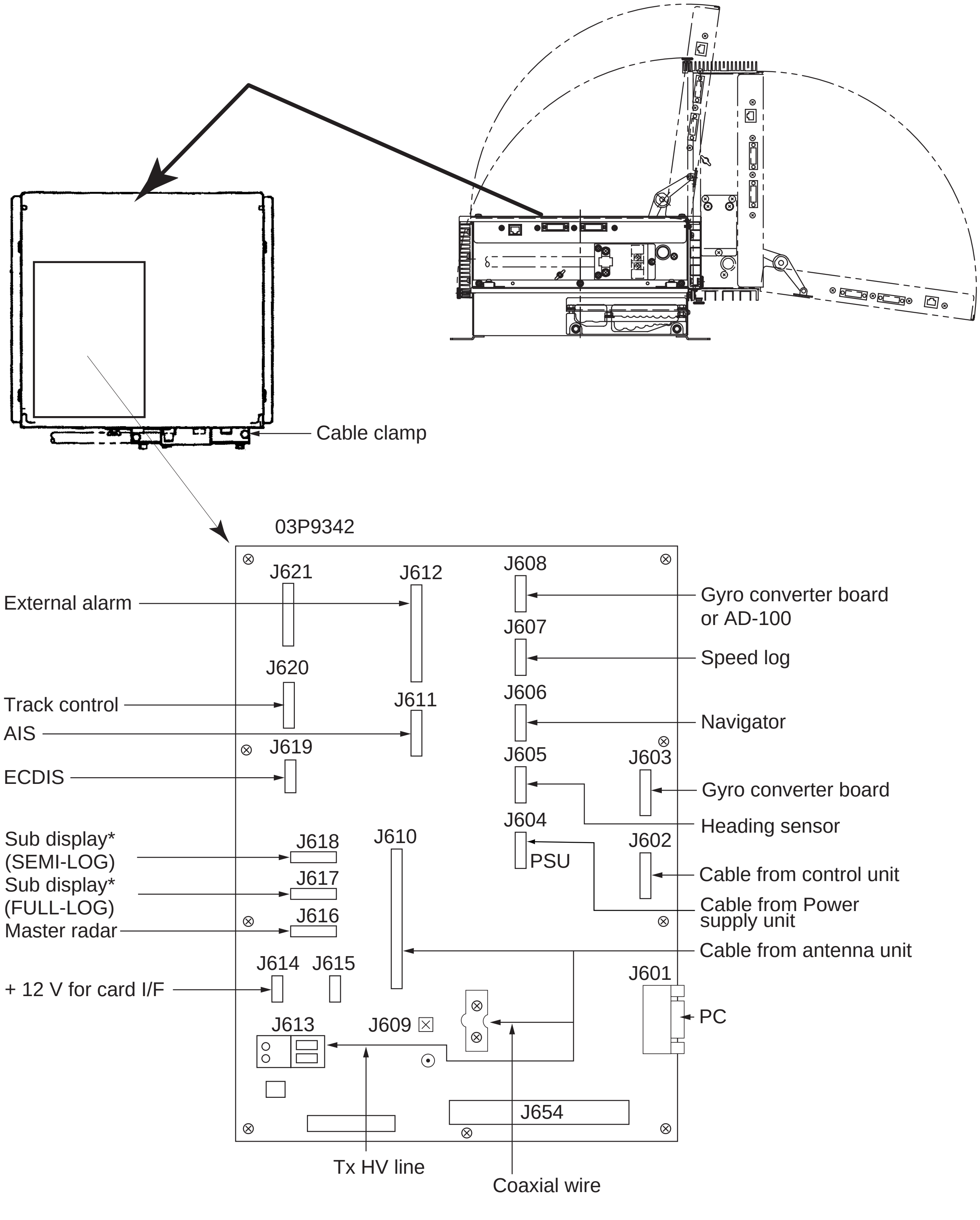
When the RCU-016 is installed, optional cable (XH10P-W-5P-A, L=10/20/30M) is required. Cable fabrication for each end is the same.



XH10P-W-5P-A L=10/20/30M

Location of connectors

Open the processor unit as follows and the 03P9342 board appears.

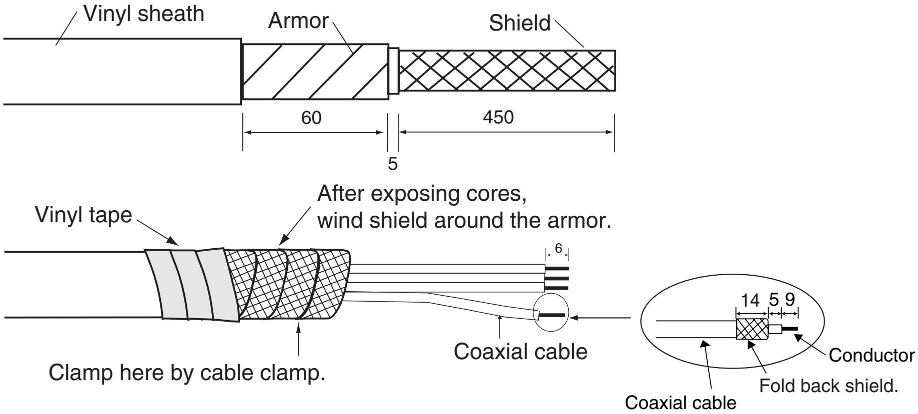


03P9342

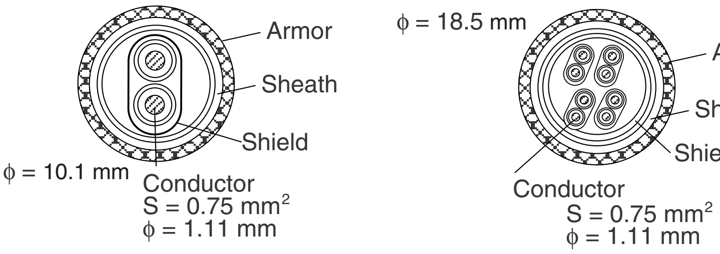
*: See page 2-11 for details.

Cable fabrication for the cables connected to the 03P9342 board

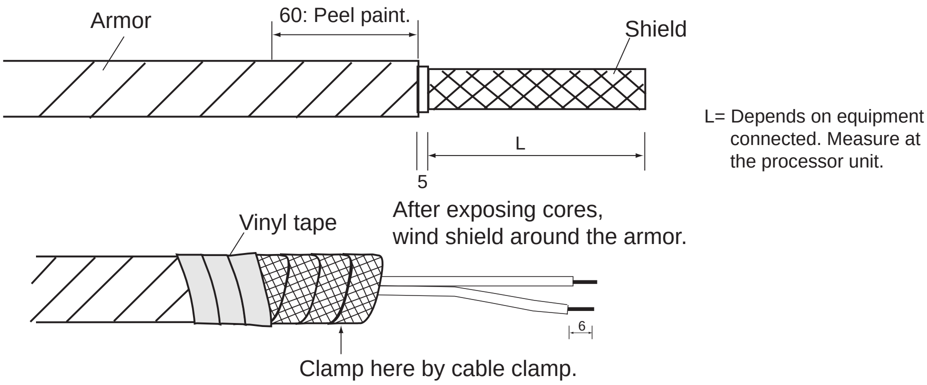
- Signal cable RW-9600 (Between antenna unit and processor unit)



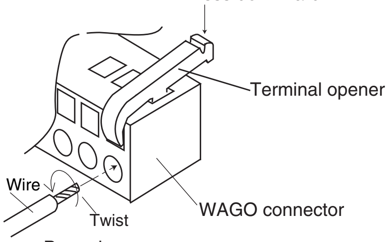
- Other cables for optional units
  Use TTYCS-1 or TTYCS-4 (Japan standard cable) or equivalent.



TTYCS-1 TTYCS-4

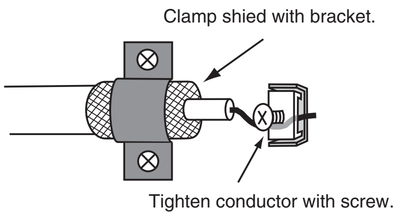


Wiring for WAGO connector



Procedures
1. Twist the conductor.
2. Press the terminal opener downward.
3. Insert the wire to hole.
4. Remove the terminal opener.
5. Pull the wire to confirm that it is ecure.

Wiring for Coaxial cable



CAUTION

Do not use crimp-on lug to prevent contact resistance from increasing.

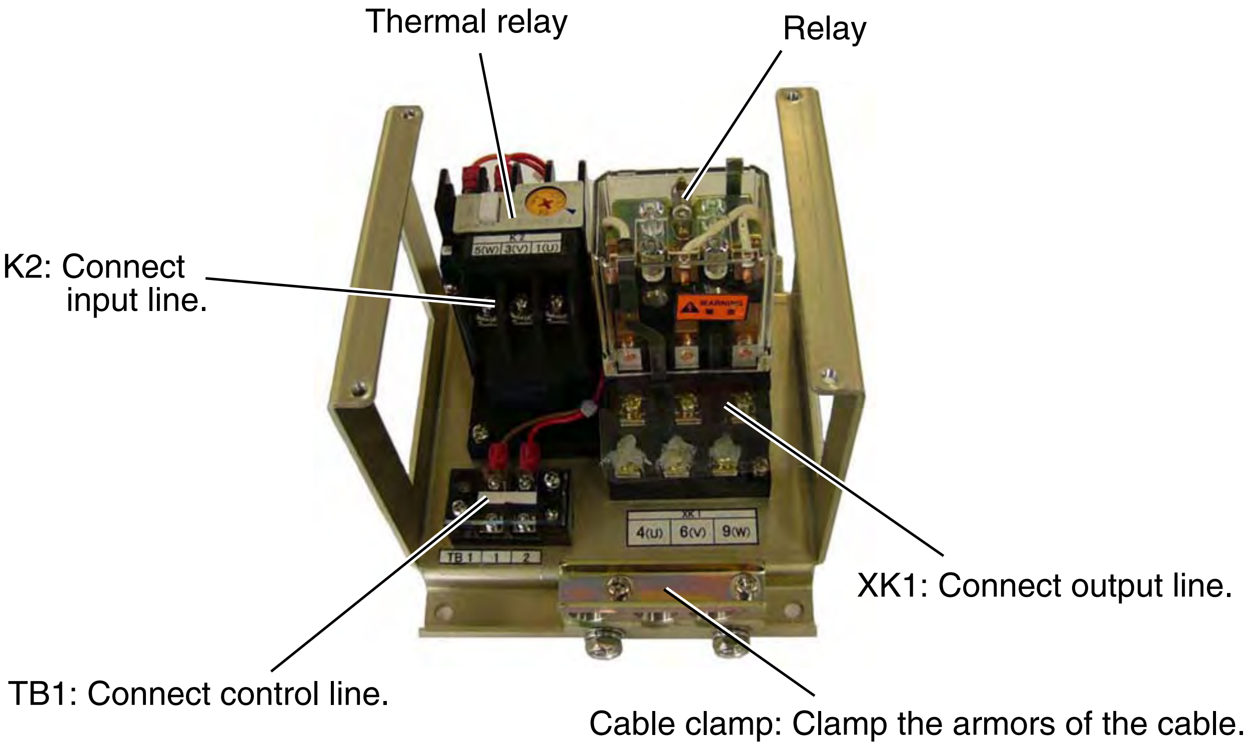
Connection of Sub-display

A conventional remote display and/or FAR-2107 series radar can be connected to J617 and J618 in the processor unit as a sub-display. However, the control for GAIN and STC are different depending on J617 and J618. Refer to the table to connect sub-displays.

Port		Conventional remote display	FAR-2107 series radar
J617 (FULL-LOG)	Overall gain	Even if input video level is adjusted to 4 Vp-p, the gain is 8 db lower than that on the master radar.	The gain is 8 dB lower than that on the master radar.
	GAIN control	The GAIN control is effective.	The GAIN control has no effect.
	STC control	The STC control is effective.	The STC control has no effect.
J618 (SEMI-LOG)	Overall gain	When input video level is adjusted to 4 Vp-p, the gain becomes the same as that on the master radar.	The gain is almost same as that on the master radar.
	GAIN control	The GAIN control is effective.	The GAIN control has no effect.
	STC control	The STC control is effective, however this control is added on the signal adjusted by the master radar. So this port is not recommended to use .	The STC control has no effect.

2.5 Power Supply Unit

Wire the unit as shown in the interconnection diagram.

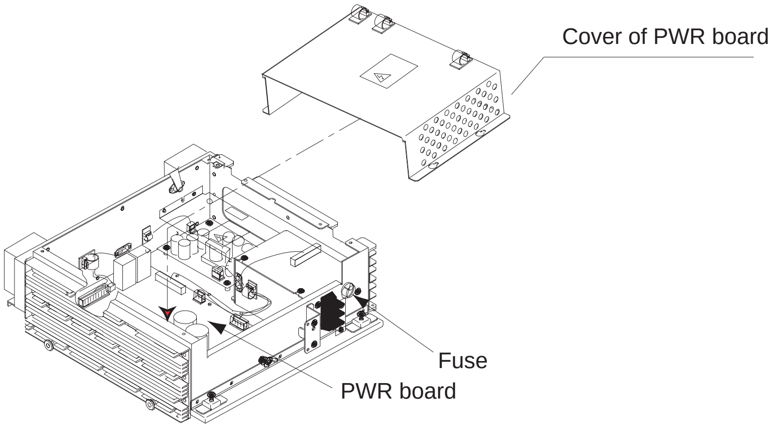


Power supply unit PSU-007

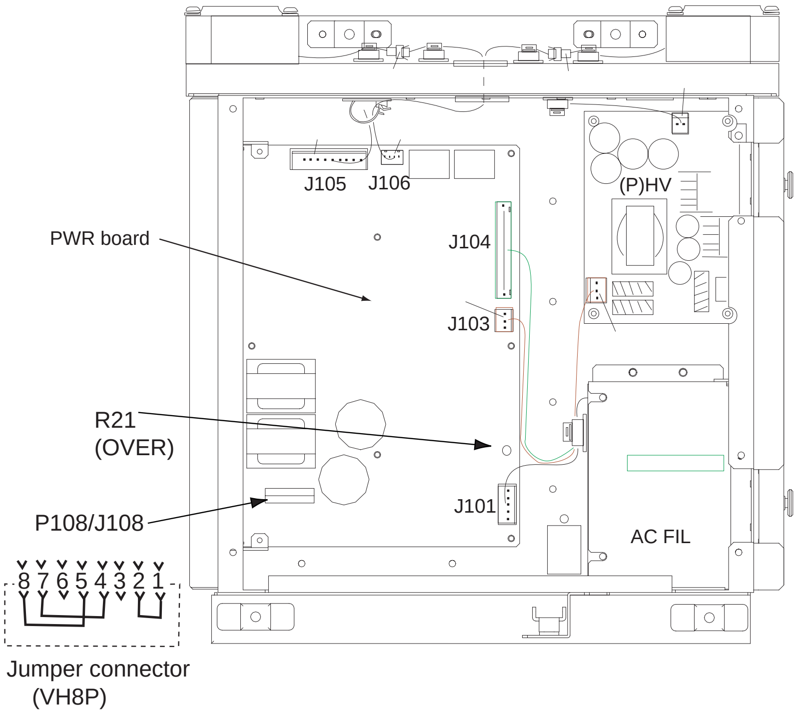
2.6 Changing AC Power Specification of Processor Unit

To change AC power specification between 100 VAC and 220 VAC, add or remove jumper connector P108 on the PWR board 03P9339 and change the fuse on the processor unit according to ship's mains as shown in the table below. The figure on the next page shows the location of the fuse and the jumper connector on the PWR board. Also, adjustment of the overvoltage detection circuit is required.
Note: To change from 220VAC to 100VAC, locally prepare the jumper connector, referring to the figure on the next page (VH8P connector housing is fitted at J108).

Power supply	Fuse	Jumper connector P108
100 VAC	10A	Added
220 VAC	5A	Removed



Upper part of processor unit
(SPU assembly omitted)



How to adjust the overvoltage detection circuit:

1. Add or remove the jumper connector P108 and change the fuse.
2. Rotate R21 fully clockwise on the PWR board.
3. Connect a variable transformer between ship's mains and the input power terminal board TB-1 of the processor unit.
4. Adjust the variable transformer output (i.e., input voltage to the processor unit) as follows.
   For 100 VAC set: 144 VAC
   For 220 VAC set: 288 VAC
5. Turn on the radar and rotate the R21 counterclockwise gradually until the overvoltage detection circuit functions (i.e., power supply cuts off).
6. Lower the output voltage of the variable transformer and confirm that the radar automatically turn on with a voltage lower than 142VAC or 284VAC.
7. Gradually increase the output voltage of the variable transformer and confirm that the overvoltage detection circuit functions at 144V or 288VAC of the variable transformer output.
8. Assemble and connect the processor unit.

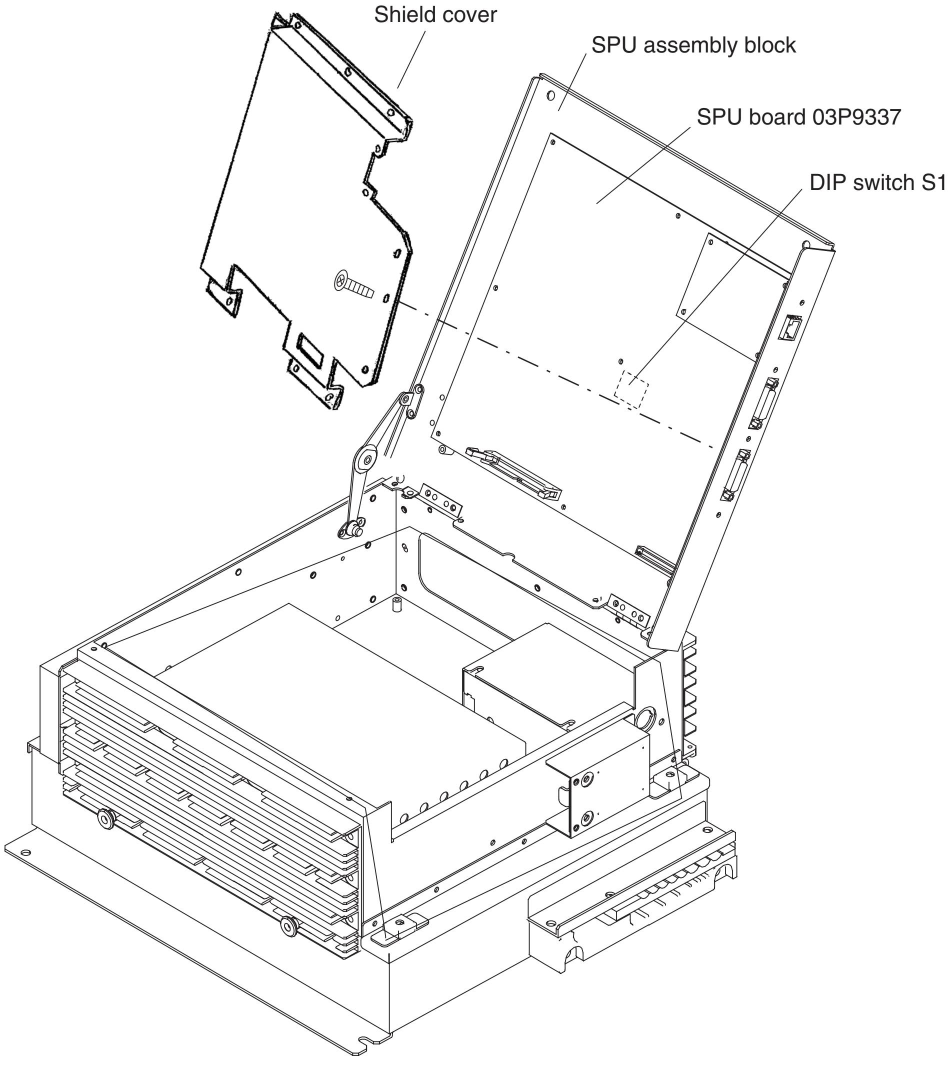
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3. SETTING AND ADJUSTMENT

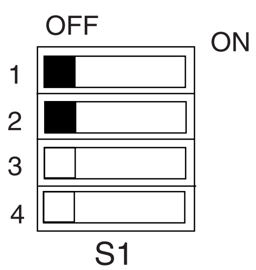
3.1 DIP Switch Setting

The processor unit is shipped for model FAR-2137S. If your model is FAR-2837S/2137S-BB, change the DIP switch setting as follows.

1. Remove the top cover of the processor unit.
2. Open the SPU assembly block and remove the shield cover.



3. Set the DIP switch S1 as follows.



S1	Monitor SXGA for FAR-2137S (Default)	Monitor UXGA for FAR-2837S (For MU-231CR S. No. 0269 and later)	FAR-2137S-BB
1	OFF	ON	OFF
2	OFF	OFF	ON
3	Not used.		
4			

Note: Set #1 and #2 of S1 to OFF for MU-231CR S. No. 0268 and earlier.

3.2 Initializing Tuning

1. Transmit the radar on 48 nm range and rotate the GAIN knob to show 70-80 of the gain bar.
2. Roll the trackball to choose the MENU box at the right side of the screen and then push the left button.
3. Roll the wheel to choose 1 ECHO and then push the wheel.

```
    [ECHO]

1  BACK
2  2ND ECHO REJ
   OFF/ON
3  TUNE INITIALIZE
4  PM
   OFF/ON
5  SART
   OFF/ON
6  WIPER
   OFF/1/2
7  ECHO AREA*
   CIRCLE/WIDE/ALL
8  [PICTURE SELECT]
9  STC RANGE
     +00
```

Bold: Default settings
(Same for all menu illustrations)
*: non IMO-type only.

ECHO menu

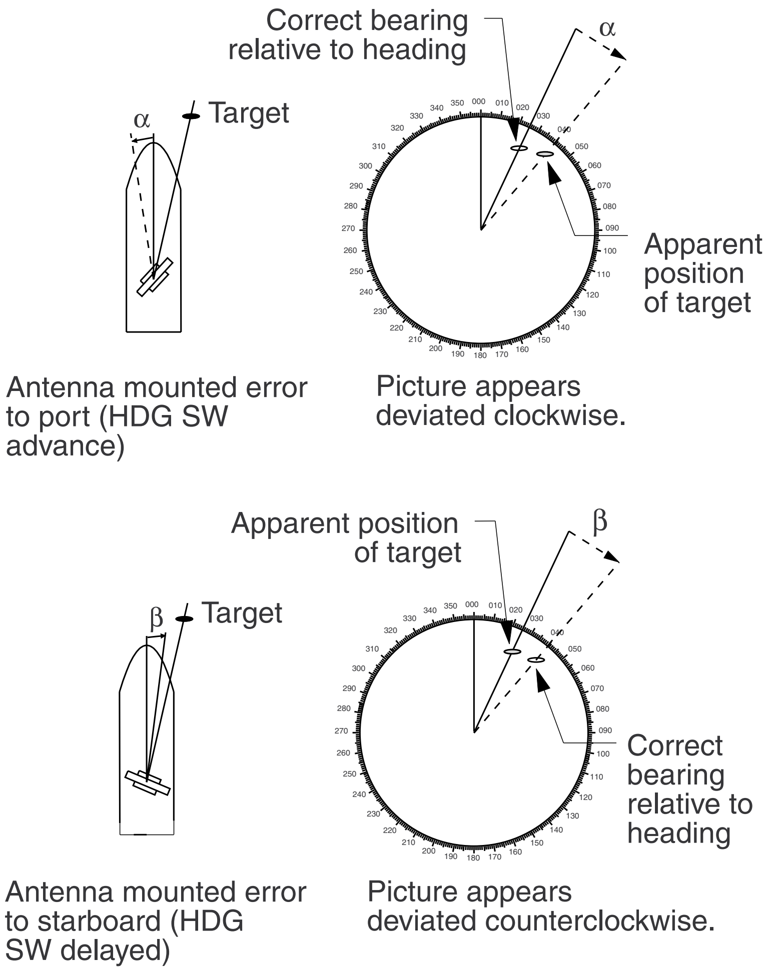
4. Roll the wheel to choose 3 TUNE INITIALIZE.
5. Push the wheel to initialize automatic tuning.

   After a while, echoes appear on the screen. The message “TUNE INITIALIZE” appears in red during automatic tuning. When this message disappears, the tuning is completed. If necessary adjust the GAIN to show echoes clearly.
6. Push the right button twice to close the menu.

3.3 Heading Alignment

You have mounted the antenna unit facing straight ahead in the direction of the bow. Therefore, a small but conspicuous target dead ahead visually should appear on the heading line (zero degrees).

In practice, you will probably observe some small bearing error on the display because of the difficulty in achieving accurate initial positioning of the antenna unit. The following adjustment will compensate for this error.



Heading alignment

1. Select a stationary target echo at a range between 0.125 and 0.25 nm, preferably near the heading line.
2. Operate the EBL control to bisect the target echo.
3. Read the target bearing.
4. Measure the bearing of the stationary target on the navigation chart and calculate the difference between actual bearing and apparent bearing on the radar screen.
5. Press the [MENU] key to show the main menu.
6. While pressing and holding down the [HL OFF] key, press the [MENU] key five times.

7. Press [0] key to show the [INITIALIZE] menu.

[INITIALIZE]
1 BACK
2 [ECHO ADJ]
3 [SCANNER]
4 [INSTALLATION]
5 [OWN SHIP INFO]
6 [TT PRESET]
7 [NETWORK]
8 [OTHER]
9 [FACTORY]

Note: See next page to access the INITIALIZE menu with the trackball style control unit RCU-015.

8. Press [2] key to open the [ECHO ADJ] menu.

[ECHO ADJ]
1 BACK
2 CABLE ATT ADJ
AUTO/MANUAL
30
3 HD ALIGN
000.0°
4 TIMING ADJ
0
5 MBS
0
6 DEFAULT ANT HEIGHT
5/7.5/10/**15**/20/
25/30/35/40/45/
more 50 m
7 NEAR STC CURVE
2/2.5/**3**/3.5/4.2
8 MID STC CURVE
3/**4**/5/6
9 FAR STC CURVE
6/**7**/8
0 RING SUPPRESSION
0

ECHO ADJ menu

9. Press [3] key to choose the HD ALIGN option.
10. Key in the bearing difference. The setting range is 0 to 359.9°
11. Confirm that the target echo is displayed at correct bearing on the screen.
12. Press the [MENU] key to finish.

How to Access the Installation Mode with the RCU-015 Trackball Style Controller



1. By using the trackball, move the pointer until it highlights the MENU box as shown. **DO NOT CLICK** the menu box, just leave the arrow over the menu.



2. Press and hold down the F1 key. Keep it held down during the next step.

3. **Then**, click on the right controller button 5 times. You should hear a "triple Beep" on the fifth press.

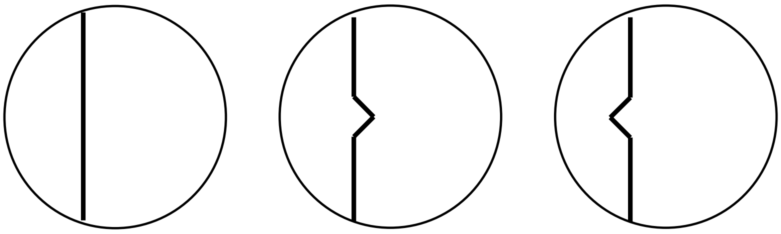


The INITIALIZE menu will appear. Click on INSTALLATION to access the installation menus.

3.4 Adjustment Sweep Timing

Sweep timing differs with respect to the length of the signal cable between the antenna unit and the processor unit. Adjust sweep timing at installation to prevent the following symptoms:

- The echo of a “straight” target (for example, pier), on the 0.25 m range, will appear on the display as being pulled inward or pushed outward. See Figure below.
- The range of target echoes will also be incorrectly shown.



(1) Correct (2) Target pushed inward (3) Target pushed outward

Examples of correct and incorrect sweep timings

1. Transmit on the 0.25 nm range.
2. Adjust radar picture controls to display picture properly.
3. Select a target echo which should be displayed straightly.
4. Press [4] key to choose the [TIMMING ADJ] on the [ECHO ADJ] menu.

[ECHO ADJ]

1 BACK
2 CABLE ATT ADJ
AUTO/MANUAL
30
3 HD ALIGN
000.0°
4 TIMING ADJ
0
5 MBS
0
6 DEFAULT ANT HEIGHT
5/7.5/10/**15**/20/
25/30/35/40/45/
more 50 m
7 NEAR STC CURVE
2/2.5/**3**/3.5/4.2
8 MID STC CURVE
3/**4**/5/6
9 FAR STC CURVE
6/**7**/8
0 RING SUPPRESSION
0

5. Rotate the wheel to set a suitable value which causes the target to be displayed straightly. The setting range is 0 to 4095.
6. Press the [MENU] key to finish.

3.5 Suppressing Main Bang

If main bang appears at the screen center, suppress it as follows.

1. Transmit the radar on a long range and then wait ten minutes.
2. Adjust gain to show a slight amount of noise on the display.
3. Select the 0.25 nm range. Adjust sea clutter to suppress.
4. Press [5] key to choose the MBS on the [ECHO ADJ] menu.

[ECHO ADJ]
1 BACK
2 CABLE ATT ADJ
AUTO/MANUAL
30
3 HD ALIGN
000.00°
4 TIMING ADJ
000
5 MBS
0
6 DEFAULT ANT HEIGHT
5/7.5/10/**15**/20/
25/30/35/40/45/
more 50 m
7 NEAR STC CURVE
2/2.5/**3**/3.5/4.2
8 MID STC CURVE
3/**4**/5/6
9 FAR STC CURVE
6/**7**/8
0 RING SUPPRESSION
0

5. Rotate the wheel to set a suitable value so that the main bang disappears. The setting range is 0 to 255.
6. Press the [MENU] key to finish.

3.6 Other Settings

ECHO menu setting

Open the [ECHO ADJ] menu as described on page 3-2.

```
[ECHO ADJ]
1  BACK
2  CABLE ATT ADJ
     AUTO/MANUAL
     30
3  HD ALIGN
     000.0°
4  TIMING ADJ
     0
5  MBS
     0
6  DEFAULT ANT HEIGHT
     5/7.5/10/15/20/
     25/30/35/40/45/
     more 50 m
7  NEAR STC CURVE
     2/2.5/3/3.5/4.2
8  MID STC CURVE
     3/4/5/6
9  FAR STC CURVE
     6/7/8
0  RING SUPPRESSION
     0
```

To close the menu, press the [MENU] key.

CABLE ATT ADJ

Before adjusting, set the radar as follows:
IR: 2, ES: off, EAV: off, 24nm range, long pulse
(Same as default setting of PICTURE1)
To adjust the cable attenuation manually, choose MANUAL by pressing [2] and the [ENTER] key, and then rotate the wheel so that noise just appears on the screen when the gain is set to 80. Default setting is 30 for the antenna cable length of 15m. The setting range is 0 to 73.
To adjust automatically, choose AUTO and press the [ENTER] key. The message "(CABLE ATT ADJ" appears in red at the bottom of the screen. It takes about five minutes to complete the adjustment, after which the exedra goes into stand-by.

DEFAULT ANT HEIGHT

Select height (m) of the radar antenna unit from the sea surface among 5, 7.5, 10, 15, 20, 25, 30, 35, 40, 45 and "more 50 m".

NEAR STC CURVE, MID STC CURVE AND FAR STC CURVE

Use the default setting. Change the setting if desired according to sea condition.

RING SUPPRESSION

This is mainly used to removes "ring" noise which appears in the waveguide-type radar. Adjust so the rings disappear at the range of 0.125 nm. The setting range is 0 to 255.

Scanner setting

1. Open the INITIALIZE menu described on page 3-3 and 3-4.
2. Press [3] key to open the SCANNER menu.

```
        [SCANNER]
1  BACK
2  BLIND SECTOR 1
     START 000°
     ANGLE 000°
3  BLIND SECTOR 2
     START 000°
     ANGLE 000°
4  ANT REVOLUTION
     LO/HI/AUTO
5  ANT SW
     OFF/ON
6  ANT STOPPED
     STBY/TX
7  M SPEC
   OFF/ON
8  BB TYPE
   NORMAL/BB
9  [DUAL RADAR]*
```

Note 1: Set the blind sector as minimum as possible.
Note 2: Do not set the blind sector in the bow direction.

*non IMO-type only

To close the menu, press the [MENU] key.

BLIND SECTOR 1 and BLIND SECTOR 2

Set area (up to 2) where no radar pulses will be transmitted, and the heading should be adjusted before setting any sector. For example, set the area where an interfering object at the rear of the scanner would produce a dead sector (area where no echoes appear) on the display. To enter an area, enter start bearing relative the heading and dead sector angle. To erase the area, enter 0 for both the START and ANGLE sections. The setting range of START is 0 to 359° and ANGLE is 0 to 180°.

ANT REVOLUTION

Not used for FAR-2137S/2837S/2137S-BB.

ANT SW and ANT STOPPED

This is used for antenna maintenance by serviceman.

Note: Choose OFF at ANT SW to prevent the antenna rotation. As for ANT STOPPED, choose STBY to prevent transmission while the antenna is stopped.

M SPEC and BB TYPE

Not used.

DUAL RADAR

See section 3.7.

INSTALLATION menu setting

Open the INSTALLATION menu by pressing [4] key on the INITIALIZE menu.

[INSTALLATION]

1 BACK
2 RADAR*
  MAIN/SUB
3 RANGE UNIT **
  NM/SM/km/kyd
4 RADAR NO***
  1/2/3/4/5/6/7/8
5 RADAR POSN
  FORE/**MAIN TOP**/
  MAIN 2ND/MAIN 3RD/
  AFT/PORT/
  STAR BOARD
6 MODEL
  6/**12**/25 UP/25 DOWN/
  50/30 UP/30 DOWN/60
7 TYPE
  IMO/A/B/C/W
8 ON TIME
  XXXXXXX.X H
9 TX TIME
  XXXXXXX.X H
0 PM GAIN ADJ
  0

*: Cannot be selected.
**: non IMO-type only.
***: No.1-4: with antenna unit
No.5-8: without antenna unit

RADAR

Choose main radar or sub radar.

RANGE UNIT

Choose NM, SM, km or kyd (kilo yard) as appropriate, however-IMO type radar is “NM” only.

RADAR NO and RADAR POSN

For multiple radar system using the network hub, set number (name) and antenna position for each system to easily distinguish the radar configuration.

MODEL

Confirm the model of your radar. If the setting of this item is different from your model (combination of the antenna unit), the radar functions abnormally.
Select “30 UP” for FAR-2137S/ 2837S/ 2137S-BB.

TYPE

Choose type of radar: IMO, A, B, C, or W.

ON TIME and TX TIME

These items show number of hours the radar has been turned on and transmitted, respectively. Value can be changed; for example, after replacing magnetron TX Time can be reset to 0.

PM GAIN ADJ

When you choose this item, the radar setting changes as follows.

RANGE:	24 NM
PULSE:	LONG
BLIND SECTOR:	OFF
STC:	OFF by Manual
RAIN:	OFF by Manual
ECHO STRECH:	OFF
ECHO AVERAGE:	OFF
VIDEO CONTRAST:	2-B
TUNE:	AUTO

1. Adjust the GAIN control so that a slight amount of white noise appears on the screen. Arcs for performance monitor appear on the screen (Fig.1).
2. Adjust PM GAIN ADJ so that outer arc just disappears (Fig.2).

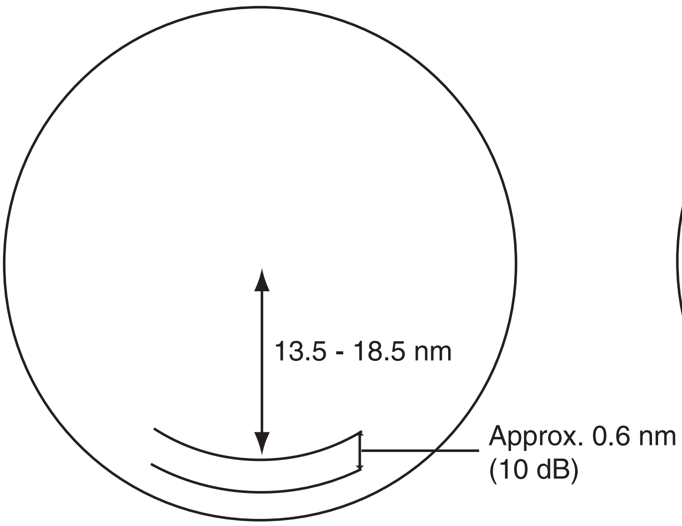


Fig.1

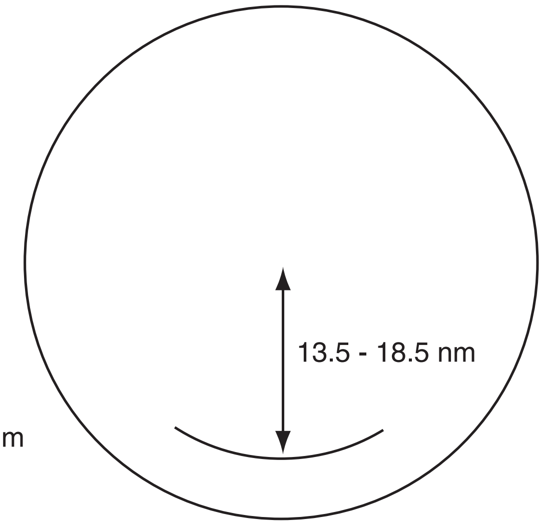


Fig.2

OWN SHIP INFO menu setting

Open the OWN SHIP INFO menu by pressing [5] key on the INITIALIZE menu.

```
        [OWN SHIP INFO]
1  BACK
2  LENGTH/WIDTH
     LENGTH  100 m
     WIDTH      50 m
3  SCANNER POSN
     BOW  0 m
     PORT  0 m
4  GPS1 ANT POSN
     BOW  0 m
     PORT  0 m
5 GPS2 ANT POSN
     BOW  0 m
     PORT  0 m
6  CONNING POSN
     BOW  0 m
     PORT  0 m
```

LENGTH/WIDTH and SCANNER POSN

To inscribe own ship shape on the screen when you choose it on the menu, enter length and width of the ship and antenna position from the bow and left sides.
The setting ranges are as follows.

LENGTH:	0 to 999 m
WIDTH:	0 to 999 m
BOW:	0 to 999 m
PORT:	0 to 999 m

GPS 1 ANT POSN and GPS 2 ANT POSN

These items are needed for AIS information. Enter the GPS antenna position from the bow and left sides. The setting ranges are the same as above.

CONNING POSN

Enter the conning position in the wheelhouse, from the bow and left sides. The setting ranges are the same as above.

When you set the display reference point to the conning position, these values are used to correct the radar antenna position.

Note: When two or more radars are installed, items other than 3 SCANNER POSN should be the same on each radar.

TT PRESET menu setting

Open the TT PRESET menu by pressing [6] key on the INITIALIZE menu.

[TT PRESET]
1 BACK
2 TT DATA OUTPUT
OFF/TTM/TTD
REL/TRUE
4800/9600/
19200/38400
3 MAX RANGE
24/32
4 ECHO LEVEL
16
5 QV DISPLAY
OFF/ON
6 TT W/O GYRO*
OFF/ON
7 [TT PRESET]
8 [TRACK PRESET]
9 [TT SENSOR DATA]
0 DEFAULT

[TT PRESET]
1 BACK
2 LAND SIZE
1200 M
3 ANT SELECT
XN12AF/XN20AF/
XN24AF/XN4A/XN5A
SN30AF/SN36AF/
SN4A/SN5A
4 AUTO ACQ CORRE
5 SCAN
5 AUTO ACQ WEED
1 SCAN
6 [TT DETAIL DATA]

[TRACK PRESET]
1 BACK
2 GATE SIZE
S/ M /L/LL
3 FILTER RESPONSE
1/ 2 /3/4
4 LOST COUNT
9 SCAN
5 MAX SPEED
100 KTS
6 TRACKING MODE
1 /2/3/4
7 START TIME TGT VECT
TIME /SCAN
50 SEC
20 SCAN

*: Not on IMO radar

TT DATA OUTPUT

Set the output format from J619 port (sentence, bearing and baud rate) of tracked targets.

Sentence: (OFF: No output, TTM: Tracked target information, TTD: Tracked target data)
Bearing: REL: Target bearing from own ship, degree relative,
Target course, degree relative.
TRUE: Target bearing, degree true, target course, degree true.
Baud rate: (4800, 9600, 19200 or 38400 bps)

NOTE: The TT DATA OUTPUT port changes according to the setting for INS as described on page 3-15.
INS-OFF: Output from J619 port only
INS-SERIAL: Output from J619 and J620 (TTM only) ports
INS-LAN: Output from J619 and NETWORK (TTM only) ports

MAX RANGE

Choose the ARPA tracking range, 24 or 32 nm.

ECHO LEVEL

Set the detection level of echoes. The setting range is 1 to 31.

QV DISPLAY

OFF: Normal picture
ON: Quantized picture; always off at power on

TT W/O GYRO (Not on IMO radar)

If a gyrocompass is not connected, choose the TT function, ON(working) or OFF (no working).

LAND SIZE

Set the land size in units of 100 m. The setting range is 100 to 1000 m.

ANT SELECT

Set the antenna radiator type of your radar.

AUTO ACQ CORRE

Set the correlation count of automatic acquisition. The setting range is 3 to 10.

AUTO ACQ WEED

Set the cancel count of automatic acquisition. The setting range is 1 to 5.

GATE SIZE

Set the gate size among S, M, L, or LL.

FILTER RESPONSE

Set the filter response function. The setting range is 1 to 4.

LOST COUNT

Set the lost count. The setting range is 1 to 20.

MAX SPEED

Set the maximum tracking speed. The setting range is 40 to 150.

TRACKING MODE

Set the tracking mode among 1 to 4.

START TIME TGT VECT

Choose time which a vector appears after acquisition, TIME or SCAN and set seconds or scan counts.

OTHER menu setting

Open the OTHER menu by pressing [8] key on the INITIALIZE menu.

```
        [OTHERS]
1   BACK
2   DEMO ECHO
    OFF/EG/TT-TEST/PC
3   EAV W/O GYRO
    OFF/ON
4   TT CATEGORY SELECT
    CAT1/CAT2•3
5   INS
    OFF/SERIAL/LAN
```

EAV w/o GYRO

If a gyrocompass is not connected, choose the echo average function, ON (working) or OFF (no working).

TT CATEGORY SELECT

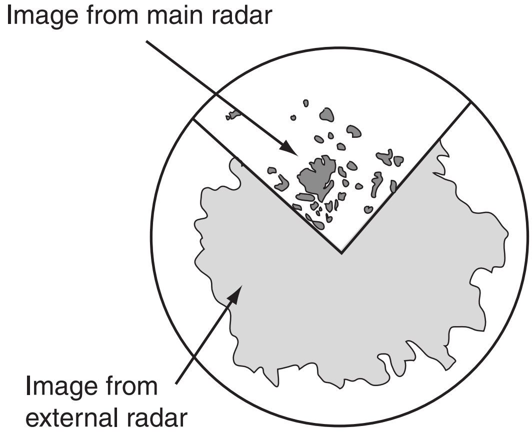
Choose CAT1 or CAT2▪3 depending on your ship size.
CAT1: All ships over than 10,000 GT
CAT2: All ships between 500 and 10,000 GT
CAT3: All ships less than 500 GT

INS

Choose appropriate item according to the ECDIS connected.
OFF: No connection
SERIAL: When connecting FEA-2105 series ECDIS.
LAN: When connecting FEA-2107 series ECDIS.

3.7 Dual Radar Display (non IMO-type only)

The image from two or more radars may be shown together on one radar display. This allows you to take advantage of the best characteristics radars has to offer.



Separate internal and external images ("COMBINE" setting)

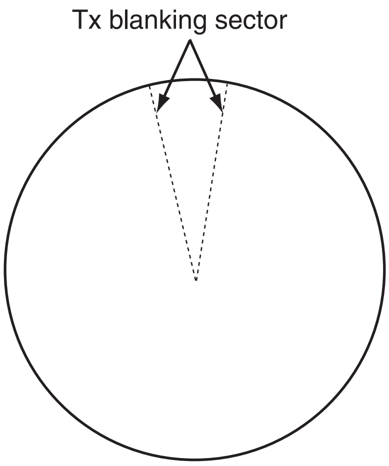
The following should be done in order to enable the dual radar display:

- Set antenna position correctly on both the main radar and the external radar.
- Select external radar to use, from the DUAL RADAR menu. (See paragraph 3.7.3.)

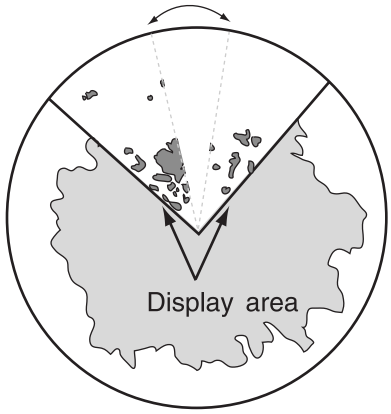
3.7.1 Enabling/Disabling the Dual Radar Display

Enable or disable the dual radar display as shown in this section.

Note 1: The Tx blanking sector boundary lines are not shown when the dual radar display is active. Further, neither the internal or external image is shown in the Tx blanking sector.



Tx blanking sector



Dual radar display with Tx blanking sector

Note 2: In the dual radar display, a guard zone set on the main radar is also accommodated on the external radar. When the position of the antennas for the main and external radars is different and the No. 2 guard zone is set on a close-in range, the on-screen guard zone may be shifted slightly from both the main radar antenna reference and external radar antenna reference. Accordingly, on the dual radar display, the actual guard zone area may be shifted slightly. For example, the guard alarm sounds against a target which has almost entered the guard zone. The further the range the smaller the shift; however, there is little shift with the No.1 guard zone (3-6 mile range, fixed). Further, do not set a guard zone such that it straddles a boundary line of the dual radar sector.

A guard zone cannot be set while the dual radar display is active. Set a zone before activating the dual radar display.

1. Open the INITIALIZE menu. See page 3-4.
2. Press the [3] key to show the SCANNER menu.
3. Select 9 [DUAL RADAR] and push the left button.

```
  [DUAL  RADAR]
1 BACK
2 DUAL RADAR
  OFF/    COMBINE
3 COMBINE MODE
  OWN/EXT
4 COMBINE SECTOR
  START  000°
  ANGLE 000°
5 COMBINE RANGE
  START      00.00NM
  LENGTH   00.00NM
6 EXT RADAR
  1/2/3/4
```

4. Select 2 [DUAL RADAR] and push the left button.
5. Select OFF or COMBINE as appropriate and push the left button. For COMBINE, the ANTENNA box at the top left-hand side becomes gray.
   OFF: Turn off the dual radar display.
   COMBINE: Display a part of the external radar image in the window on the main radar.

Push the right button four times to close the menu.

Note 1: The dual radar function becomes inoperative when the external radar is turned off, set to stand-by, or set as sub display. When this happens, the buzzer sounds and the message "EXT RADAR STBY" (power off, stand-by only) appears.

Note 2: The dual radar display is inoperative on the stern-up and shuttle ferry modes.

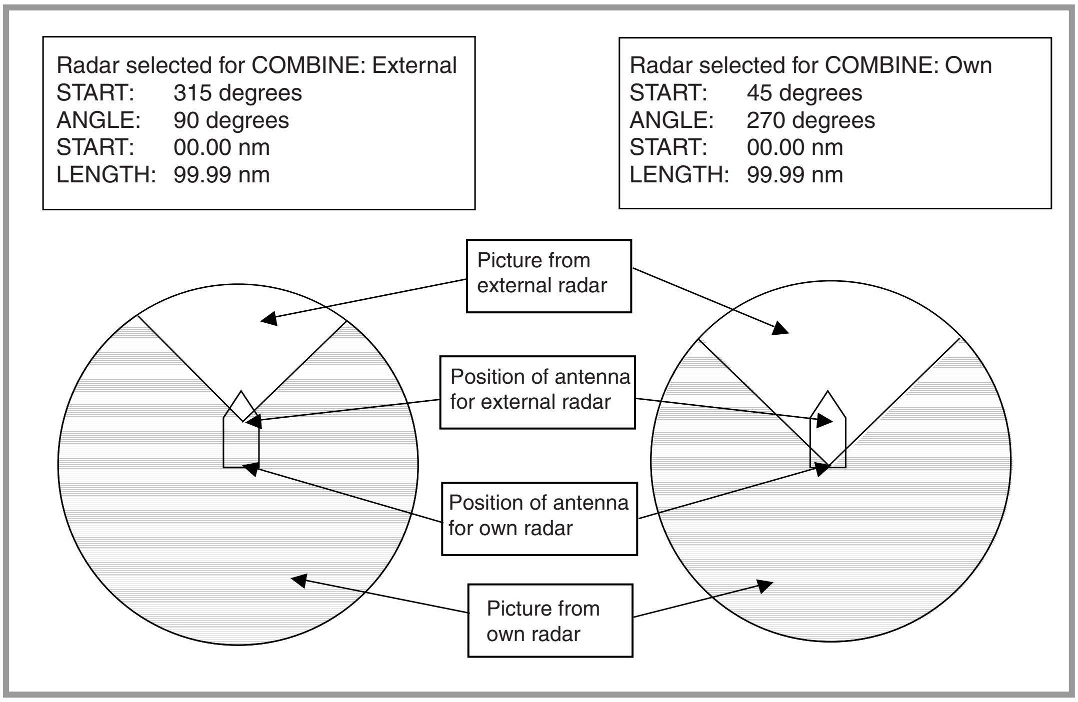
Note 3: Some functions of the external radar image, listed below, may be adjusted from the main radar.

1) Left-click the radar selection indication "CTRL OWN" at the top-left side of the screen to switch control to the external radar. The indication then shows "CTRL EXT". Each click of the indication switches control between the main and external radar alternately.
2) The external image may be adjusted from the main radar. The following functions may be adjusted:
   · Transmit/stand-by switching
   · PICTURE box setting
   · GAIN
   · A/C SEA
   · A/C RAIN
   · Tuning
   · ECHO menu setting (2nd trace echo rejector, performance monitor)
   · Range scale
   · TT functions.
   · CPA/TCPA box settings

3.7.2 Specifying Sector Width and Length

When 2 DUAL RADAR in the DUAL RADAR menu is set for "COMBINE", specify the width and length of the sector from the external radar to display on own radar.

1. Open the INITIALIZE menu.
2. Press the [3] key to show the SCANNER menu.
3. Select 9 [DUAL RADAR] and push the left button.
4. Select 3 COMBINE MODE and push the left button.
5. Select OWN or EXT and push the left button.
   a) **OWN:** Set own radar's antenna as reference point and set display area of own radar. The area outside that set here is where the image from the external radar will be displayed.
   b) **EXT:** Set external radar's antenna as reference point and set display area of external radar. The area outside that set here is where the image from own radar will be displayed.

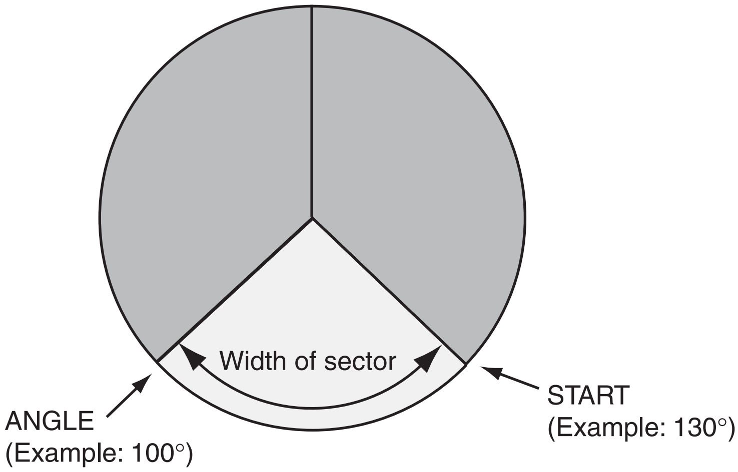


6. Select 4 COMBINE SECTOR and push the left button.

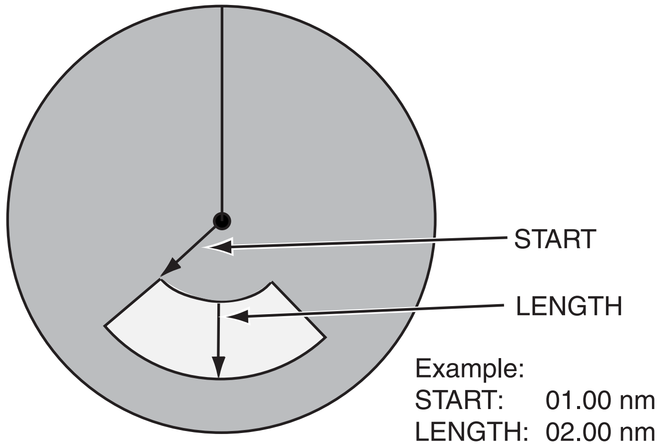
7. Use the scrollwheel to set START and ANGLE, referring to the description and example below. Spin the scrollwheel to set and push it to confirm.

   c)A solid green line marks the dual radar display area.
   - START: Start point of the sector (in degrees, 000-359)
   - ANGLE: Width of the sector (in degrees, 000-359)

   d)In the example below, START is 130° and ANGLE is 100°.



8. Select 5 COMBINE RANGE and push the left button.
9. Use the scrollwheel to set START and LENGTH, referring to the example below. Spin the scrollwheel to set and push it to confirm.
   - START: Set range start point.
   - LENGTH: Set length of sector.



Push the right button four times to close the menu.

3.7.3 Choosing External Radar (image source)

Select the external radar to use in the dual radar display.

1. Open the INITIALIZE menu.
2. Press the [3] key to show the SCANNER menu.
3. Select 9 [DUAL RADAR] and push the left button.

```
   [DUAL  RADAR]
1 BACK
2 DUAL RADAR
  OFF/    COMBINE
3 COMBINE MODE
  OWN/EXT
4 COMBINE SECTOR
  START  000°
  ANGLE  000°
5 COMBINE RANGE
  START      00.00NM
  LENGTH   00.00NM
6 EXT RADAR
  1/2/3/4
```

4. Select 6 EXT RADAR and push the left button.
5. Select desired radar no. and push the left button.
   Only the numbers of connected radars are valid. Radar no. is set on the Installation Setting menu.
6. Press the [MENU] key to close the menu.

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4. INSTALLING OPTIONAL EQUIPMENT

4.1 Gyro Converter GC-10

The Gyro Converter GC-10, incorporated inside the processor unit, converts analog gyrocompass reading into digital coded bearing data for display on the radar screen.

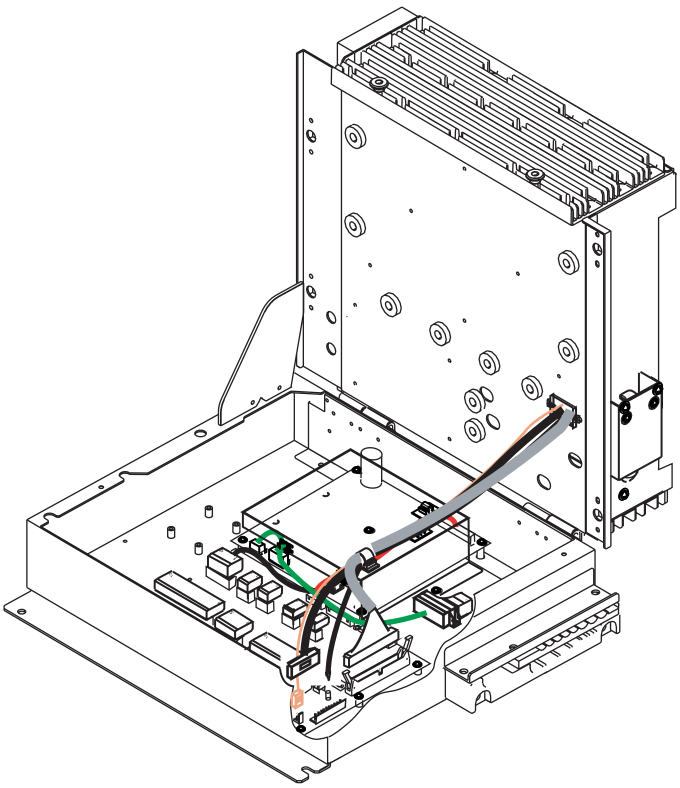
This section explains how to install the GC-10 (mainly consisting of the GYRO CONVERTER board) and set it up according to gyrocompass connected.

Installing the GYRO CONVERTER board

Necessary Parts: GC-10-2 (Code number 000-080-440)

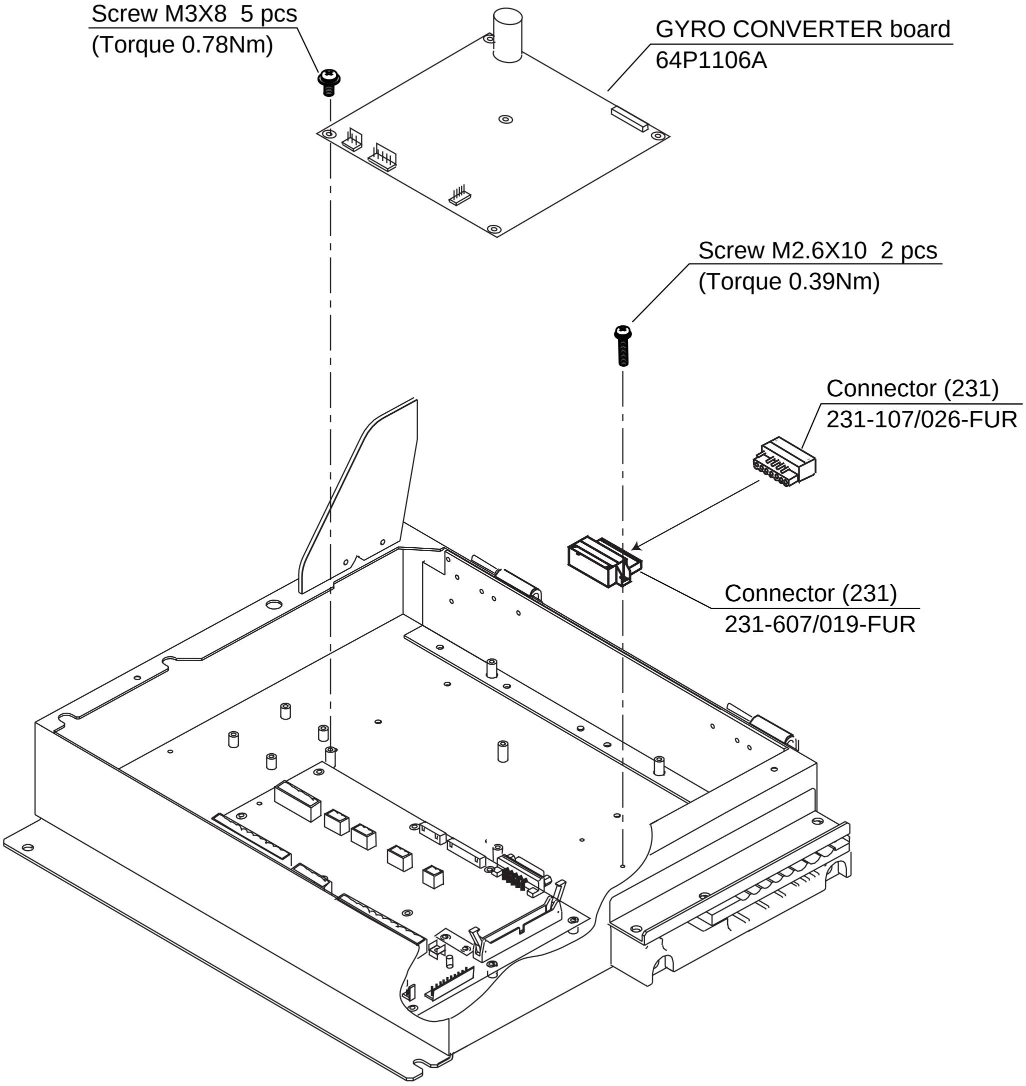
See packing list for details at the back of this manual.

1. Open the processor unit.



Processor unit (Opened)

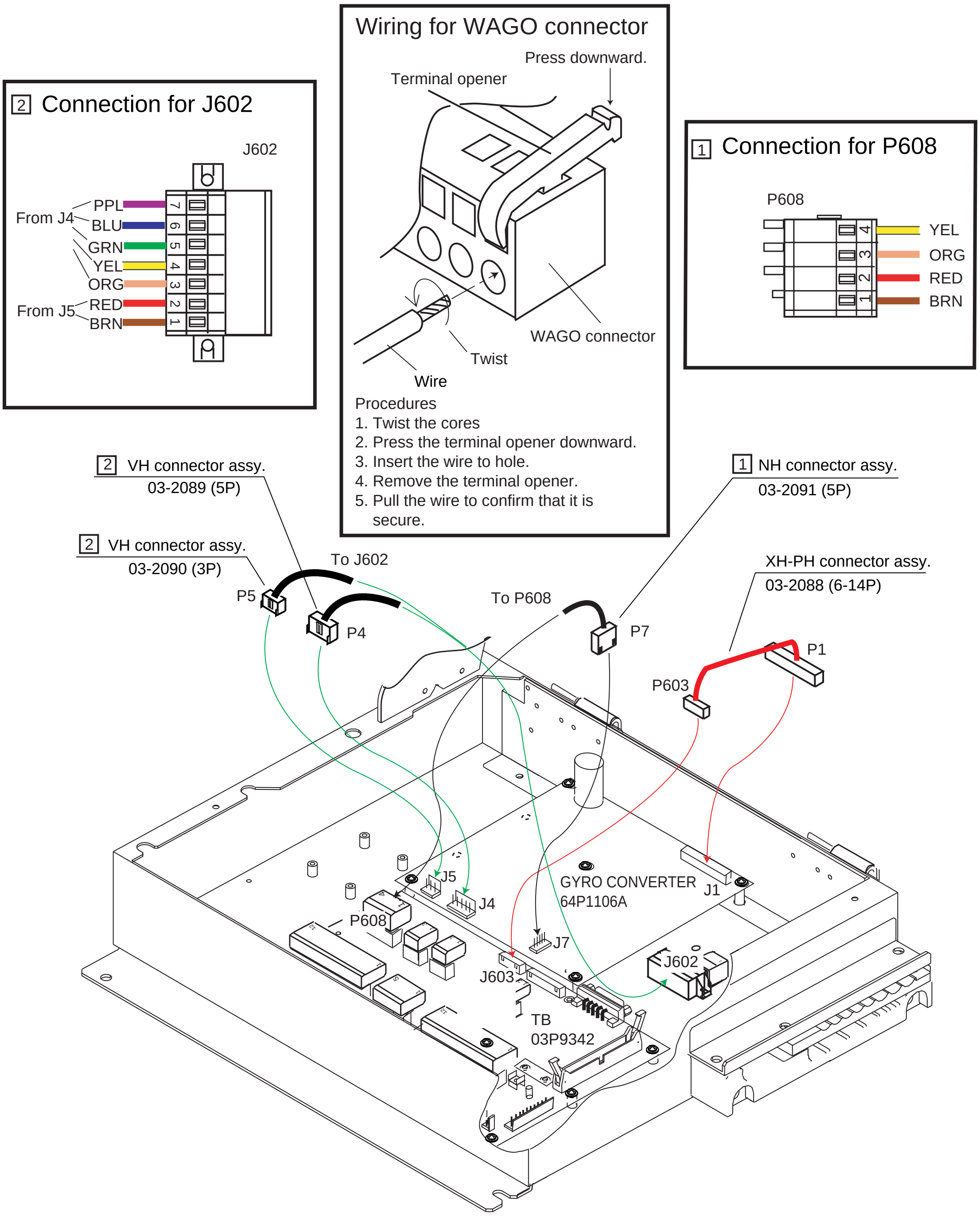
2. Fasten the GYRO CONVERTER board in the processor unit with five washer head screws and male connector 231-607/019-FUR (called J602) with two screws.



Attaching GYRO CONVERTER board in the processor unit

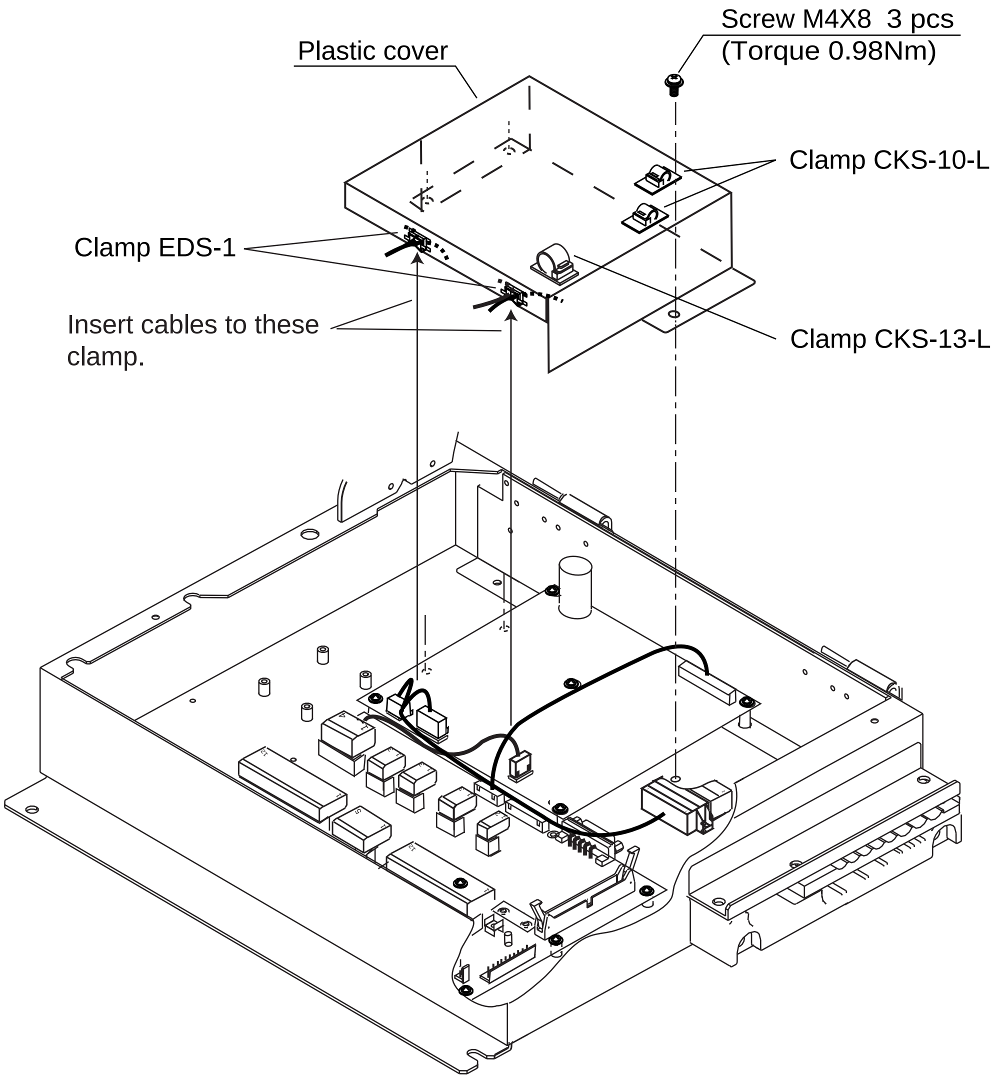
3. Connect the GYRO CONVERTER board and the 03P9342 board with connector assemblies 03-2088 and 03-2091.

4. Connect the GYRO CONVERTER board and J602 with two connector assemblies 03-2089 and 03-2090.



Connecting connector assemblies

5. Confirm gyrocompass specifications and set up the DIP switches and jumper wires on the GYRO CONVERTER board according to gyrocompass connected:
   - Setting jumper wires and DIP switches by gyrocompass specifications: page 4-5
   - Setting jumper wires and DIP switches by make and model of gyrocompass: page 4-7
   - Location of jumper wires and DIP switches: page 4-8
6. Pass gyrocompass cable through the cable clamp and connect it to connector J602 as shown in the figure on page 4-3.
7. Attach the clamps on the plastic cover and then attach the cover to the chassis as shown in the figure below. Insert cables to the clamp ED-1, respectively.



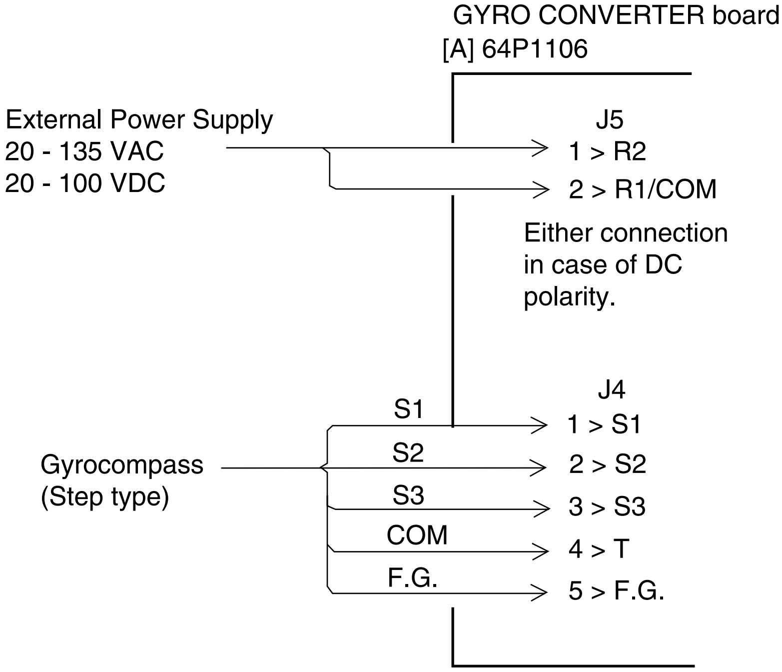
Attaching plastic cover for GYRO CONVERTER board

8. Close the processor unit.

Connection of external power supply

An external power supply is necessary when the repeater signal is step-by-step type and the step voltage is below 20 V or output voltage is less than 5 W.

1. Cut jumper wire JP1 on the GYRO CONVERTER board when an external power supply is used.
2. Connect gyro cable and power cable as shown below.



Connection of external power supply to GYRO CONVERTER board

DIP switch, jumper wire settings

Default setting

The gyro converter GC-10 is set at the factory for connection with the gyrocompass specifications below.

AC synchronous signal: 50/60 Hz
Rotor voltage: 60 V to 135 V AC
Stator voltage: 60 V to 135 V AC
Gear ratio: 360x
Supply voltage: 30 V to 135 V AC

If the specifications of the gyrocompass differ from those mentioned above, change jumper wire and DIP switch settings on the GYRO CONVERTER board. Settings may be changed according to gyrocompass specifications (see page 4-6) or make and model of gyrocompass (see page 4-7). For the location of DIP switches and jumper wires, see page 4-8.

Note: If you change the setting with power supplied, set #8 of SW2 from OFF to ON, then OFF again.

Setting method 1: DIP switch settings and gyrocompass specifications

1) Gyrocompass type

Gyrocompass type	SW 1-4	SW 1-5	SW 1-6	JP1
AC synchronous	OFF	OFF	OFF	#1, #2, #3
DC synchronous	OFF	OFF	OFF	#2, #3, #4
DC step	ON	OFF	OFF	#4, #5, #6
Full-wave pulsating current	OFF	ON	OFF	#4, #5, #6
Half-wave pulsating current	ON	ON	OFF	#4, #5, #6

2) Frequency

Frequency	SW 1-7	SW 1-8	Remarks
50/60 Hz	OFF	OFF	AC synchronous pulsating current
400 Hz	ON	OFF	AC synchronous pulsating current
500 Hz	OFF	ON	AC synchronous pulsating current
DC	ON	ON	DC synchronous DC step

3) Rotor Voltage (between R1 & R2)

Rotor Voltage	SW 2-1	JP3
20 to 45 VAC	ON	#2
30 to 70 VAC	OFF	#2
40 to 90 VAC	ON	#1
60 to 135 VAC	OFF	#1

4) Stator Voltage (between S1 & S2)

Stator Voltage	SW 2-2	SW 2-3	JP2
20 to 45 VAC, or 20 to 60 VDC	ON	OFF	#2
30 to 70 VAC, or 40 to 100 VDC	OFF	OFF	#2
40 to 90 VAC	ON	OFF	#1
60 to 135 VAC	OFF	OFF	#1

5) Ratio

Ratio	SW 1-1	SW 1-2	SW 1-3
360X	OFF	OFF	OFF
180X	ON	OFF	OFF
90X	OFF	ON	OFF
36X	ON	ON	OFF

6) Supply Voltage

Stator Voltage	JP4	JP5
20 to 45 VAC, or 20 to 60 VDC	#2	#2
30 to 70 VAC, or 40 to 100 VDC	#1	#1

7) AD-10 format data Tx interval

Select data transmitting interval for ports 1 to 6 with jumper wires JP6 and JP7: #25 for 25 ms, #200 for 200 ms.

Note: The Tx interval is available in 25 msec or 200 msec. Use 25 msec for radar.

8) NMEA-0183 Tx interval and Output sentence

Tx interval	SW 2-5	SW 2-6	Output sentence
1 s	OFF	OFF	HDT+VHW
200 ms	ON	OFF	HDT
100 ms	OFF	ON	HDT
25 ms	ON	ON	HDT

9) NMEA-0183 Version no.

Version no.	SW3-1
1.5	OFF
2.0	ON

10) NMEA-0183 Baud rate

Baud rate	SW3-2
4860bps	OFF
38400bps	ON

11) Power fail detection

Talker	SW3-3
Disable	OFF
Enable	ON

(Use OFF for radar.)

12) Stator signal breaking detection

Detection	SW2-7
Execute	OFF
No execute	ON

SW2-4: factory use only
SW3-4: not used

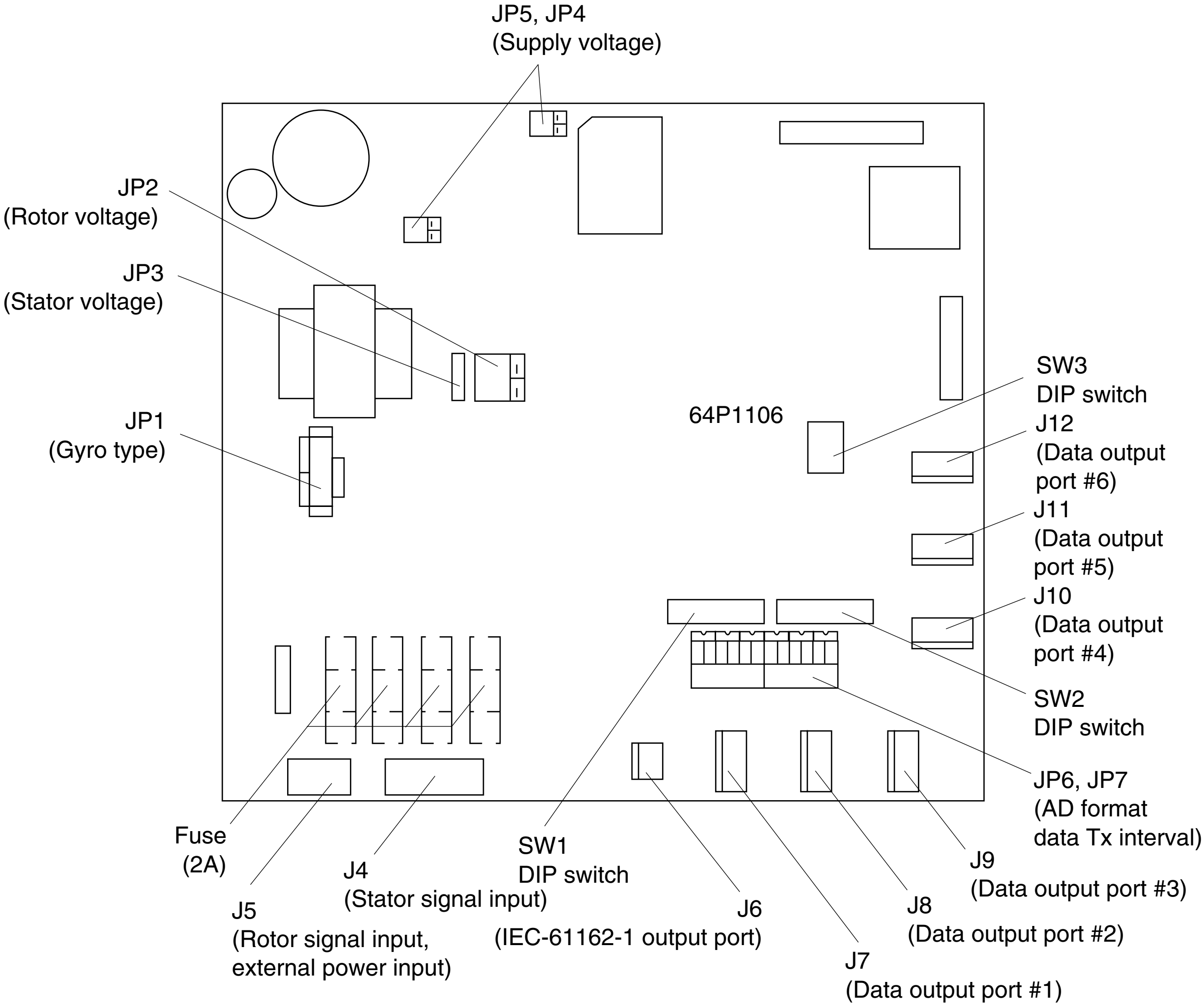
<u>Setting method 2: by make and model of gyrocompass</u>

Maker	Models	Specification	SW 1-1	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8	SW 2-1	SW 2-2	SW 2-3	JP1	JP2	JP3	JP4	JP5
Anschutz	Standard 2,3	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 22V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	#1, #2,#3	#2	#2	#1	#
	Standard 4,6	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 90V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#2	#1	#1	#
	Standard 20	DC step 35V 180x COM(-) ,3-wire(+)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#
Yokogawa Navtec (Plaith type)	C-1/1A/2/3 A-55, B-55	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 22V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	#1, #2,#3	#2	#2	#1	#
	CMZ-700	DC step 24V 180x COM(+), 3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	Remo- ve	#2	-	*	*
	CMZ-250X/ 300X/500	DC synchronous 360x	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	-	ON	OFF	Remo- ve	#2	-	*	*
		DC step 35V 180x COM(+),3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2
	CMZ-100/200/ 300 C-1Jr,D-1Z/1/3 IPS-2/3	AC synchronous 50/60Hz Rotor voltage: 100V Stator voltage: 90V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
	CMZ-50 See note below.	step 35V 180x COM(+),3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	Remo- ve	#2	-	*	*
Plaith	NAVGAT II/III	AC synchronous 50/60Hz Rotor voltage: 50/60V Stator voltage: 68V 360x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#2	#2	#1	#1
Tokimec (Sperry type)	ES-1/2/11 GLT-101/102/ 103/106K/107	AC synchronous 50/60Hz Rotor voltage: 100/110V Stator voltage: 90V 36x	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
	ES-11A/110 TG-200 PR222R/2000 PR237L/H GM 21	AC synchronous 50/60Hz Rotor voltage: 100/110V Stator voltage: 22V 90x	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
	MK-14 MOD-1/2/T NK-EN,NK-EI	DC step 70V 180x COM(-), 3-wire(+)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1
	SR-130/140	DC step 70V 180x 5-wire, open collector	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1
	TG-100/5000 PR-357/130/ 140, ES-17 GLT-201/202 /203	DC step 70V 180x COM(+), 3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1
	TG-6000	DC step 24V 180x	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2
	GM-11	AC synchronous 50/60Hz Rotor voltage: 100V Stator voltage: 90V 90x	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
	SR-120,ES-16 MK-10/20/30	DC step 35V 180x	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2
Kawasaki	GX-81	AC synchronous 50/60Hz Rotor voltage: 100/110V Stator voltage: 90V 90x	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	#1, #2,#3	#1	#1	#1	#1
Armabrown	MK-10,MKL-1 SERIES1351, MOD-4	DC step 50V 180x COM(+), 3-wire(-)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	OFF	OFF	#4, #5,#6	#2	-	#1	#1
Robertson	SKR-80	DC step 35V 180x COM(-), 3-wire(+)	ON	OFF	OFF	ON	OFF	OFF	ON	ON	-	ON	OFF	#4, #5,#6	#2	-	#2	#2

*: Set JP4 and JP5 according to the voltage of the external power supply.

Note: If CMZ-50 has 35VDC, set JP1 to #4, #5, #6.

Location of DIP switches, jumper wires on the GYRO CONVERTER board



GYRO CONVERTER board

Setting the heading readout on the radar display

Confirm that the gyrocompass is giving a reliable readout. Then, set the heading readout on the radar display with the gyrocompass readout as follows:

1. Roll the trackball to place the arrow in the HDG box at the top right corner of the screen.
2. Push the right button on the trackball module to open the HDG menu.

```
[HDG MENU]

1  HDG SOURCE
   AD-10/SERIAL
2  GC-10 SETTING
   000.0
```

HDG menu

3. Press the [1] key to choose the HDG SOURCE and choose AD-10.
4. Press the [2] key to choose the GC-10 SETTING option.
5. Roll the wheel to set gyrocompass reading.
6. Press the [MENU] key to close the menu.

4.2 Memory Card Interface Unit

Mounting considerations

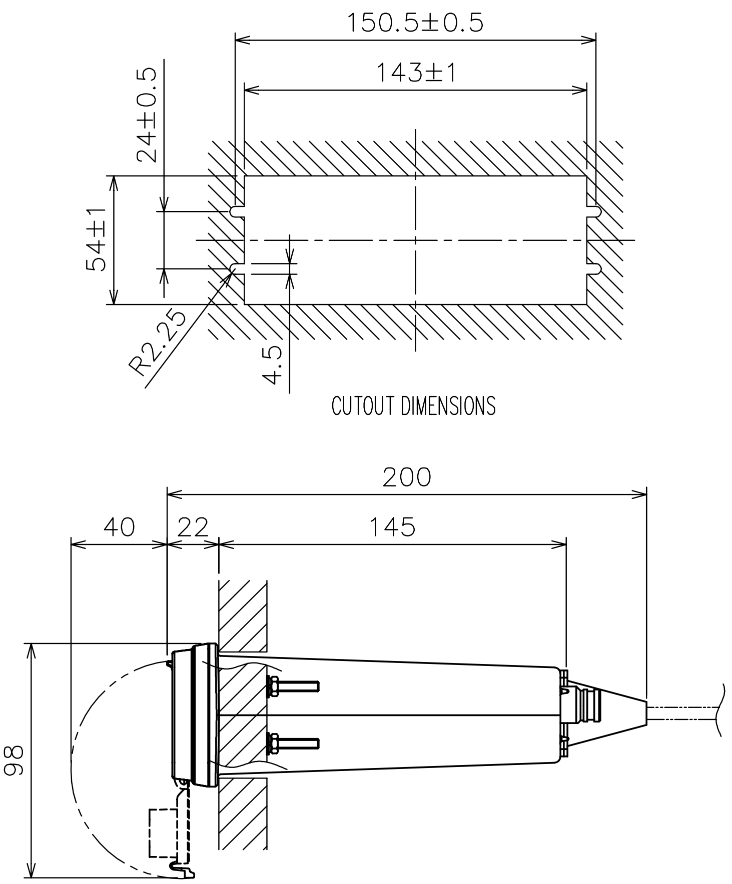
When selecting a mounting location, keep in mind the following points:

- Locate the memory card interface unit away from heat sources because of heat that can build up inside the cabinet.
- Locate the unit away from places subject to water splash and rain.
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

Flush mounting

This unit can be flush-mounted in a panel with the standard installation materials.

1. Prepare a cutout in the mounting location, referring to the outline drawing at the end of this manual.
2. Screw in the threaded rods to the flange of the front panel of the unit securely by hands.
3. Set the unit to the cutout.
4. Insert the flat washer, spring washer and nut in that order for each rod and fasten the nuts.



Flush mounting

Desktop mount

For desktop mount, the optional desktop mount kit FP03-10201 is required. Refer to the end of this manual.

1. Fix the mounting bracket 19-023-3081 on the unit with four screws.
2. Mount the above assembly on a desktop with four tapping screws.

Console mount

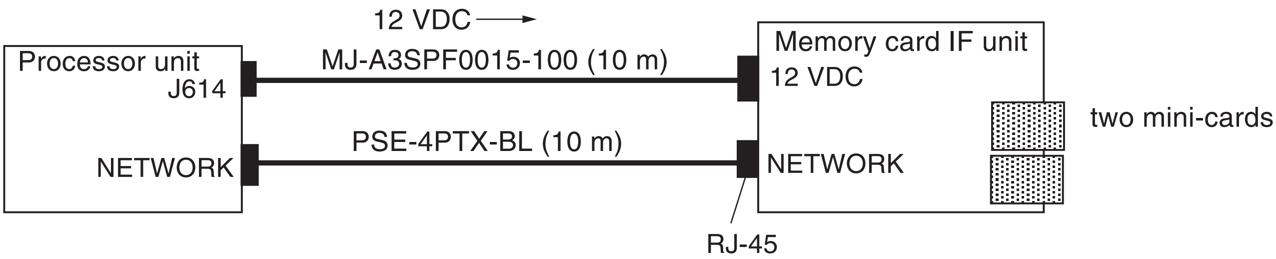
For console mount, the optional console mount kit FP03-10202 is required. Refer to the end of this manual.

1. Fix the mounting bracket 19-023-3091 on the unit with four screws.
2. Mount the above assembly to the console with four sets of nut, spring washer and flat washer.

Connection

1) Connection between one processor unit and one memory card IF unit

Connect as shown in the figure below.

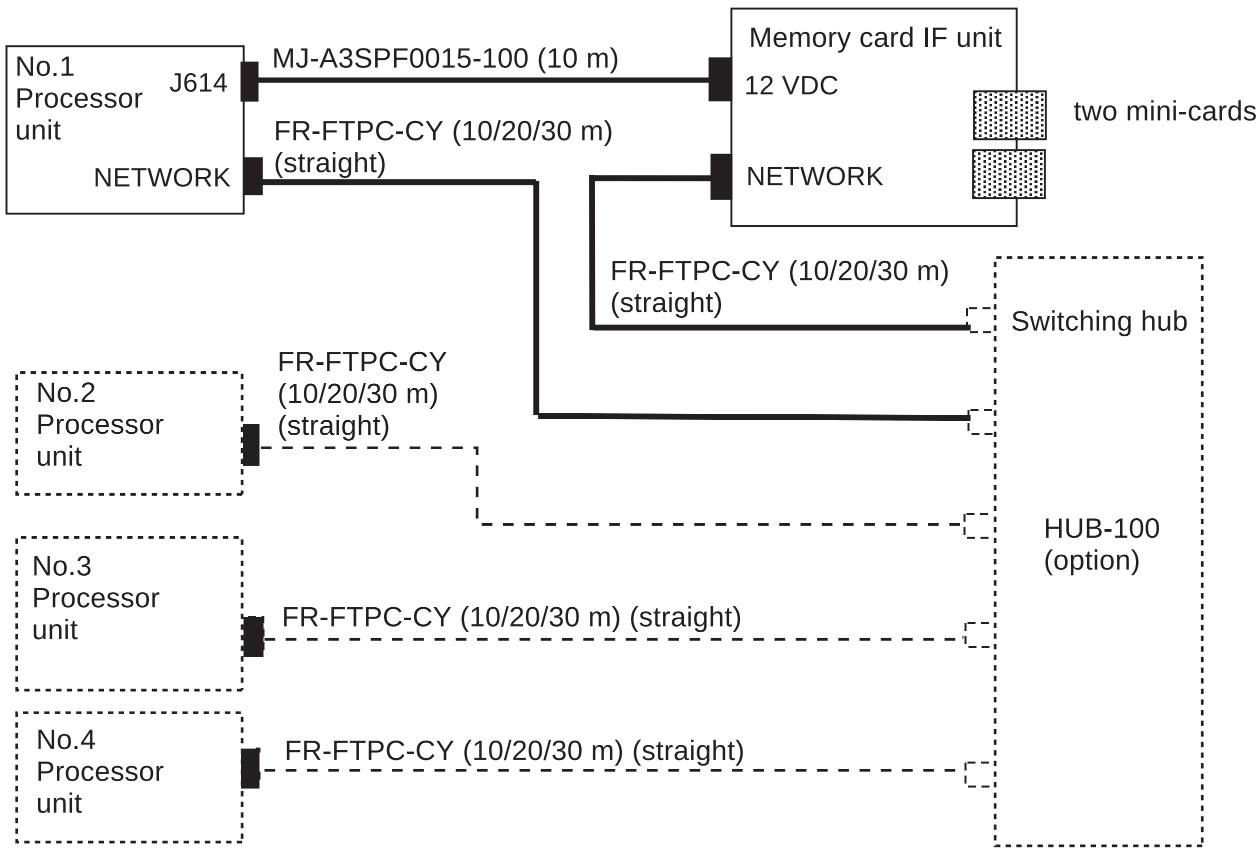


2) Connection between one memory card IF unit and multiple processor units

Prepare optional LAN cable kit and switching hub HUB-100. Connect as shown in the next page. Set the radar number on the INSTALLATION menu (see page 3-10), and then turn the power off and on.

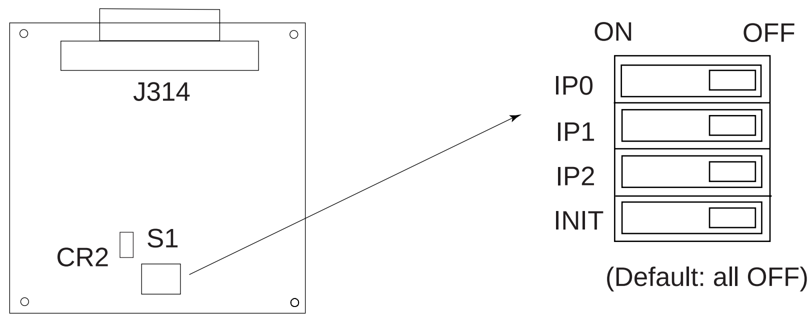
LAN cable kit

Type	Code No.	Contents
OP03-28900	000-082-658	Cable FR-FTPC-CY (10 m), Modular connector 2 pcs.
OP03-28910	000-082-689	Cable FR-FTPC-CY (20 m), Modular connector 2 pcs.
OP03-28920	000-082-660	Cable FR-FTPC-CY (30 m), Modular connector 2 pcs.



Note: When two memory card interface units are connected via network, change ID code for the second unit.

1. Remove the cover and set IP0 bit of the DIP switch S1 to ON on the CARDCPU board 03P9333.
2. Set INIT bit of S1 to ON and turn on the power of the radar. Wait till CR2 starts blinking. Never turn off the power until CR2 starts blinking.
3. Turn off the power and set INIT bit to OFF.



CARDCPU board 03P9333

4.3 DVI-RGB Conversion Kit (for VDR connection)

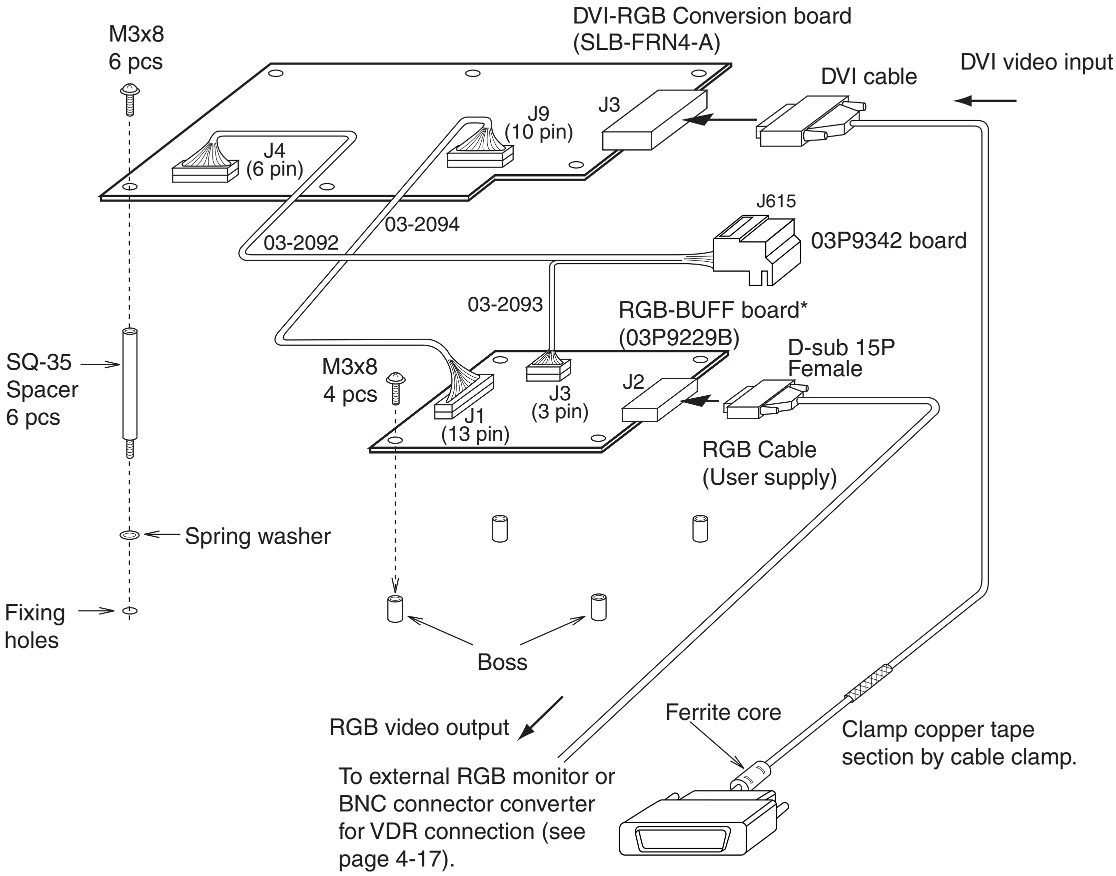
This information provides the procedure necessary for the installation of the DVI-RGB conversion kit. This kit is installed in the processor unit to enable connection of a VDR (Voyage Data Recorder) or RGB monitor to record radar pictures into a VDR. When changing the D-sub 15P of the RGB cable to the BNC connector, use the BNC connector converter described on page 4-15. This RGB output complies with the image test defined in the VDR test standard, IEC 61996.

Name: DVI-RGB conversion kit
Type: OP03-180-2
Code no.: 008-536-070
Resolution: Outputs RGB with the resolution of DVI input.

Display unit	Resolution	DIP switch setting (S-1#1)
MU-201CR	1024x1280	OFF
MU-231CR	1024x1365	ON

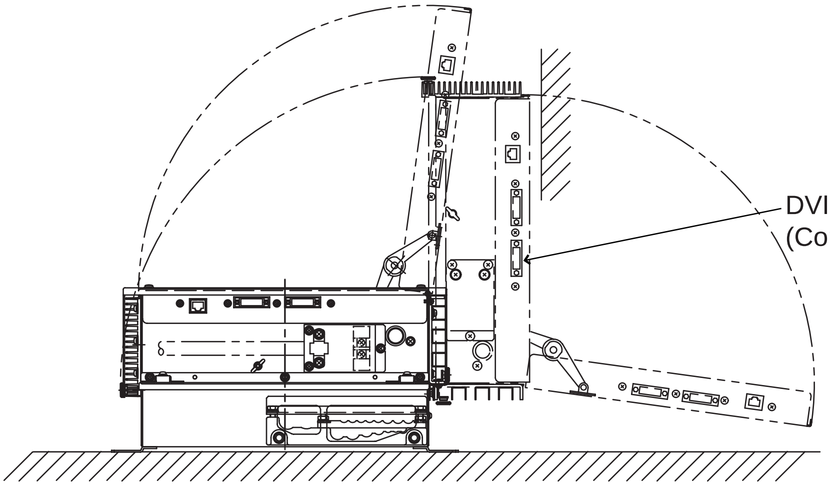
Output signal specification: Video; 0.7Vp-p, 75Ω termination, positive polarity
Horizontal sync signal; TTL level, negative polarity
Vertical sync signal; TTL level, negative polarity

See packing list for contents. Refer to the figure below for modification.



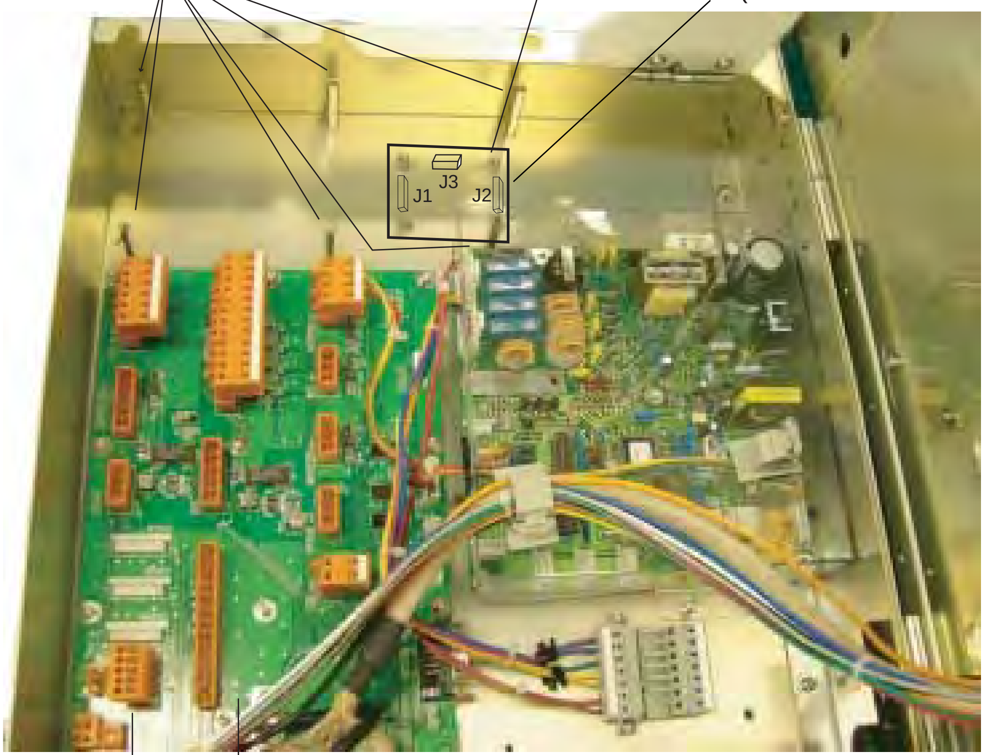
*Indepent of the MAIN board.

1. Remove the top cover and open the upper part of the processor unit.



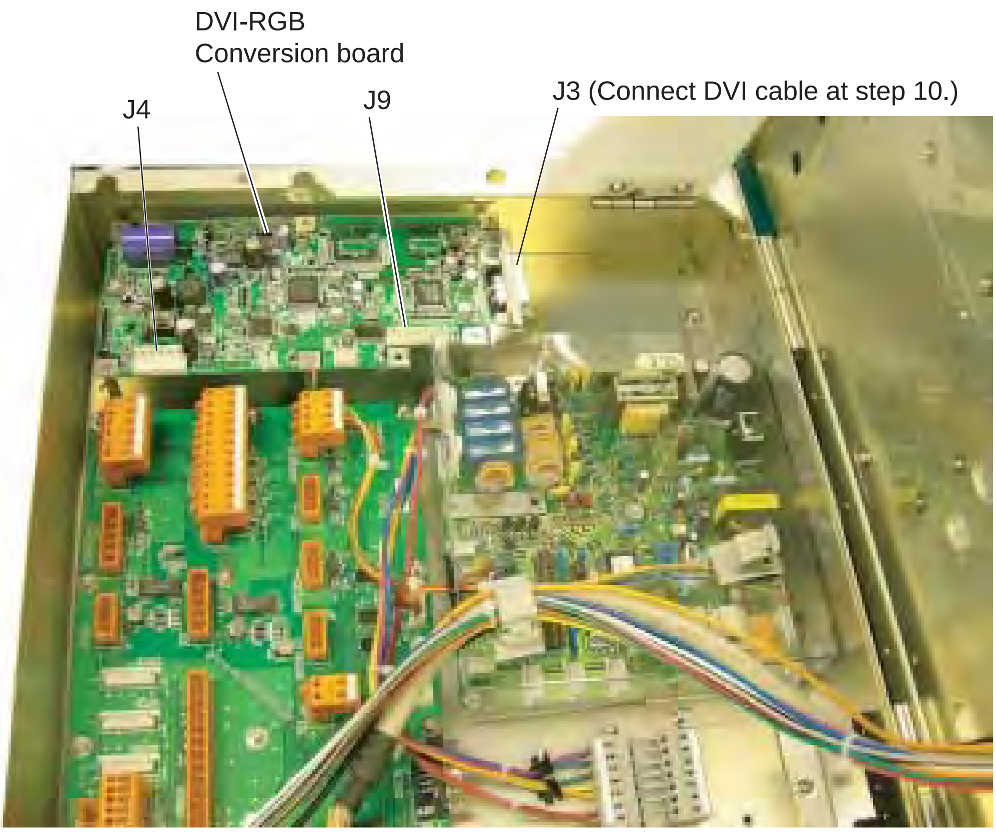
Processor unit

2. Fix the 03P9229A board (RGB-BUFF) with four screws. (See the figure below.)
3. Attach the connector assemblies to J1 and J3 on the 03P9229A board as follows.
   J1 : 13-pin connector of the connector assembly 03-2094
   J3 : 3-pin connector of the connector assembly 03-2093
4. Attach six sets of spring washers and spacers to the positions shown below.



Processor unit (Lower part)

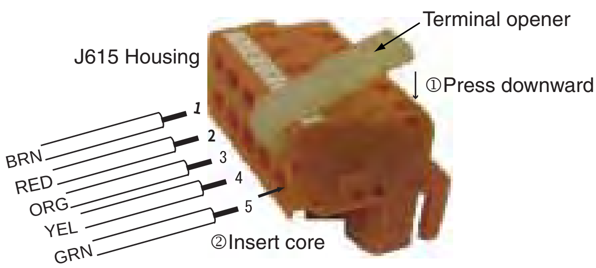
5. Attach the DVI-RGB conversion board to the location shown in the figure on the next page.



Fixing the DVI-RGB conversion board

6. Attach the 10-pin connector from J1 on the 03P9229A board to J9 on the DVI-RGB board.
7. Attach the connector assembly 03-2092 to J4 on the DVI-RGB conversion board.
8. Remove connector housing J615 from the 03P9342 board. Connect the cable from J3 on the 03P9229A board and the cable from J4 on the DVI-RGB conversion board to J615. After connection, attach J615 to the 03P9342 board.

   To connect wires to the connector housing, use the terminal opener (supplied as installation materials) as shown below.

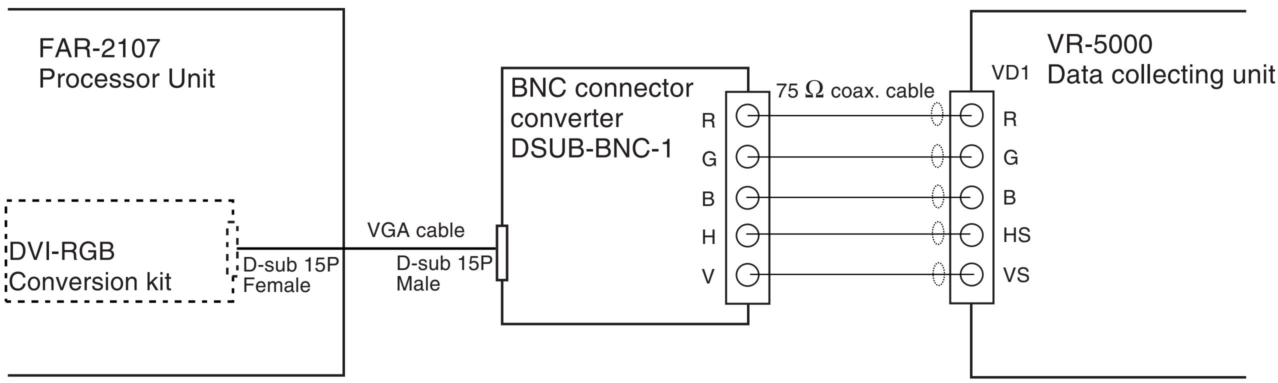


Connecting wires to the housing

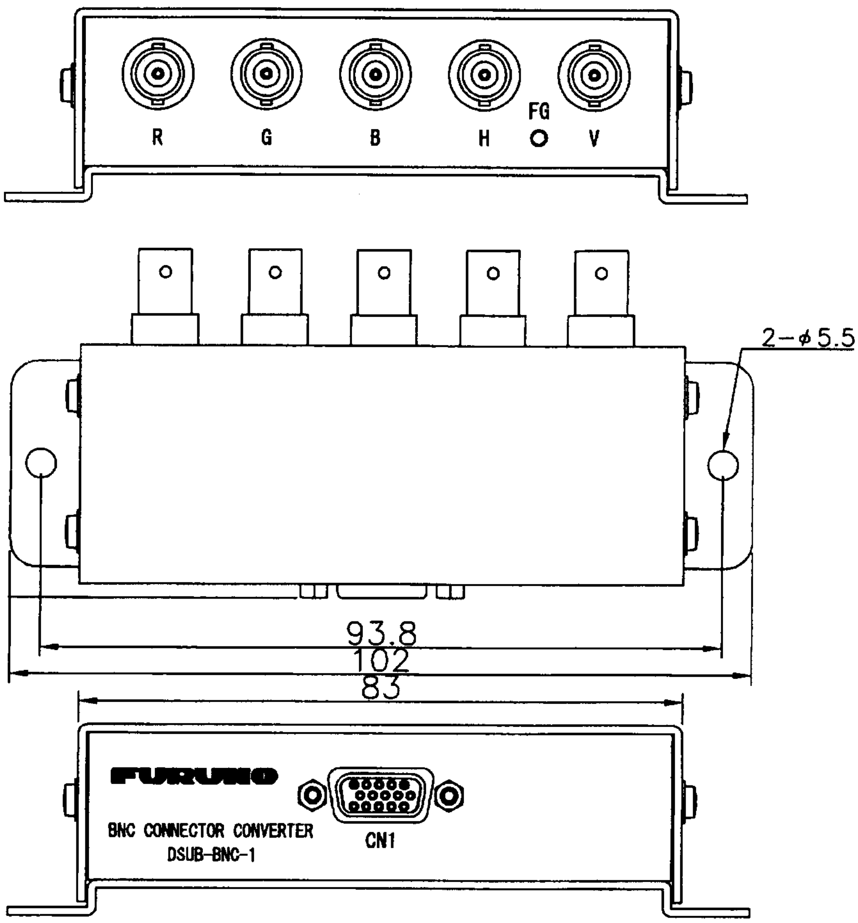
9. Connect the DVI cable to J3 on the DVI-RGB conversion board. Connect the end which does not have the ferrite core.
10. Pass an RGB cable (local supply) through the cable clamp and connect it to J2 on the 03P9229A board.
11. Pass the DVI cable through the cable clamp, laying the section with copper tape in the cable clamp.
12. Assemble the processor unit and connect the other end of the DVI cable to DVI-D port.

4.4 BNC Connector Converter

To connect the VR-5000 (FURUNO Voyage Data Recorder) to this radar, the DVI-RGB conversion kit (mentioned at previous paragraph) and the BNC connector converter are required. Also VGA cable (between the processor unit and the BNC connector converter) and five 75 ohms coaxial cables (between the BNC connector converter and VR-5000) are required.



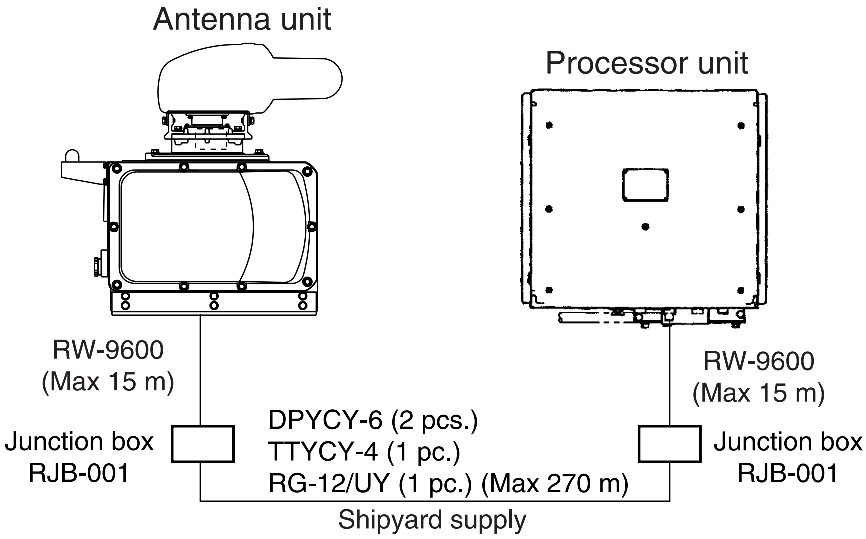
Interconnection



4.5 Junction Box

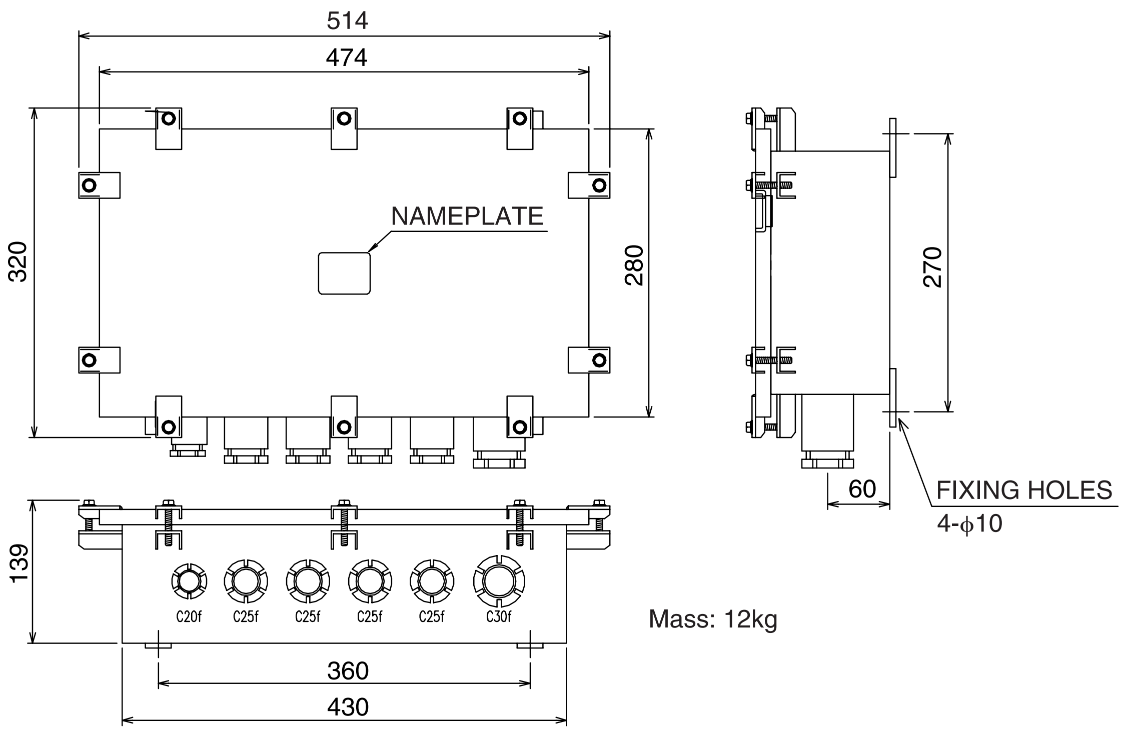
Junction Box

If the length of the antenna cable is more than 100 m, the optional junction boxes are required. These boxes should be mounted at the location protected because its waterproofing is IPX3.



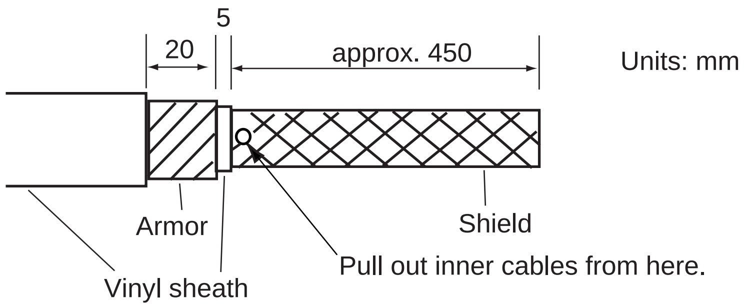
Mounting

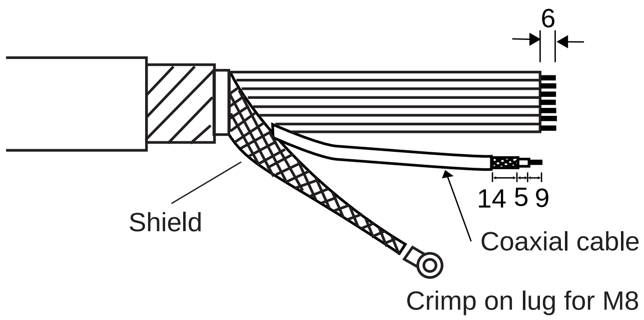
Fasten the junction boxes to the mounting location with four sets of M8 bolt and nut.



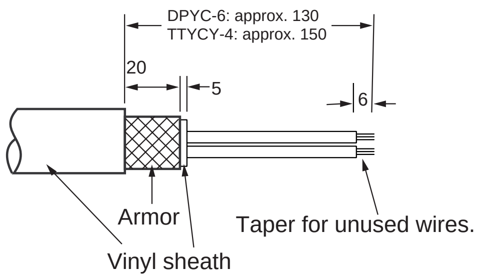
Cable fabrication

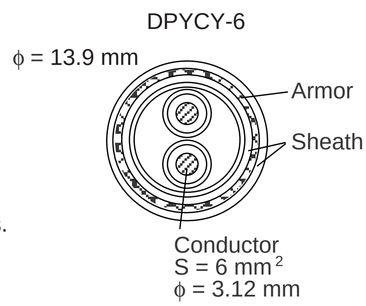
RW-9600

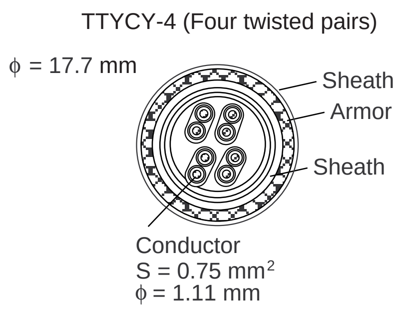




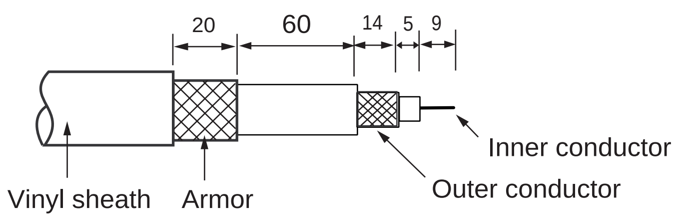
DPYC-6 and TTYC-4





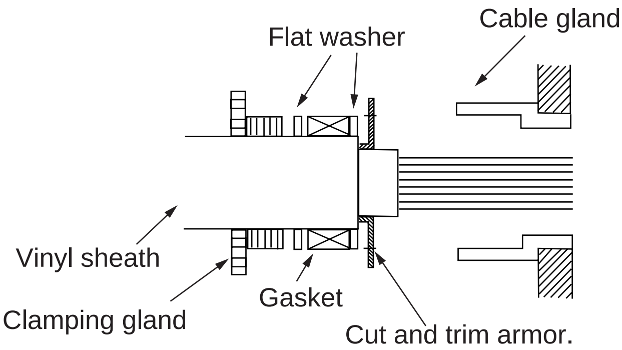


RG-12/UY

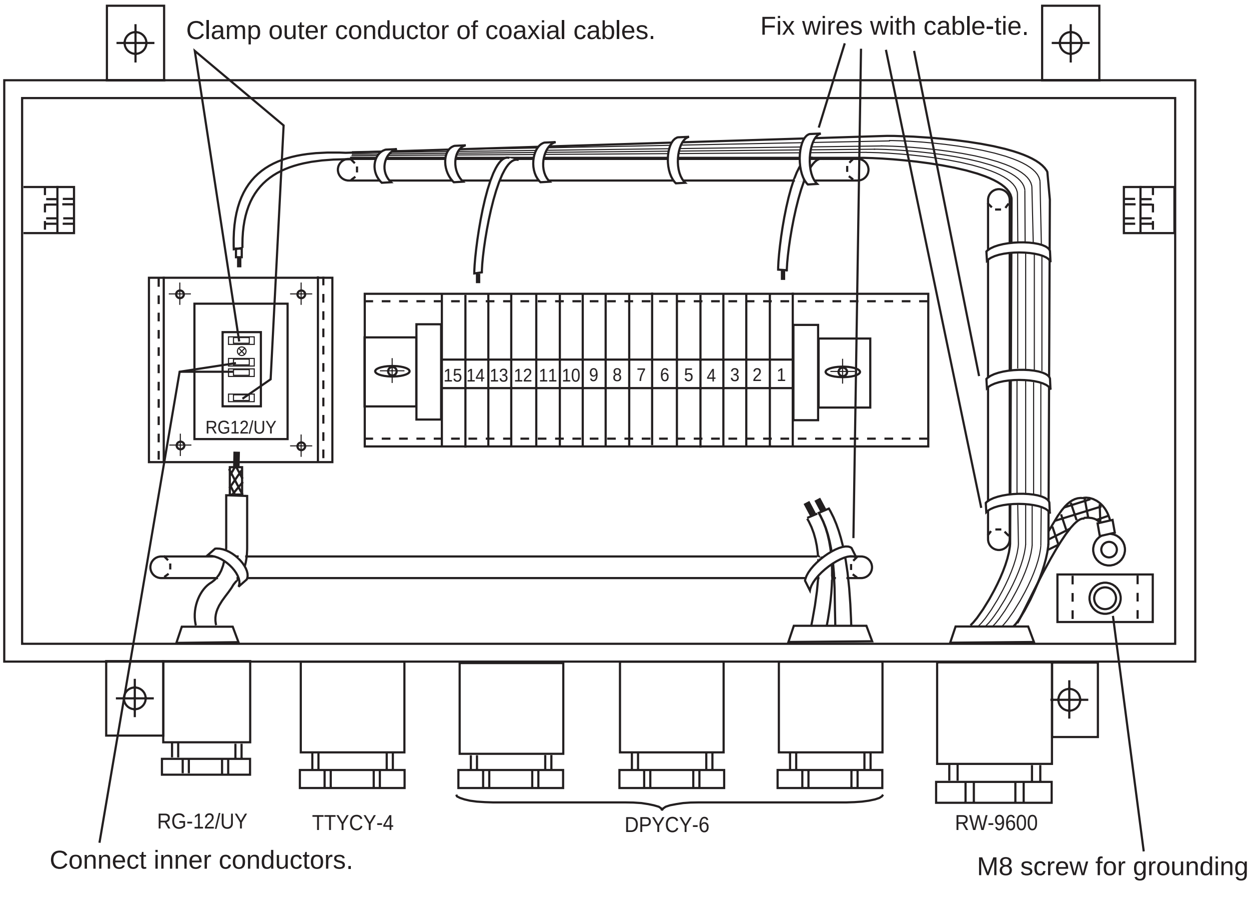


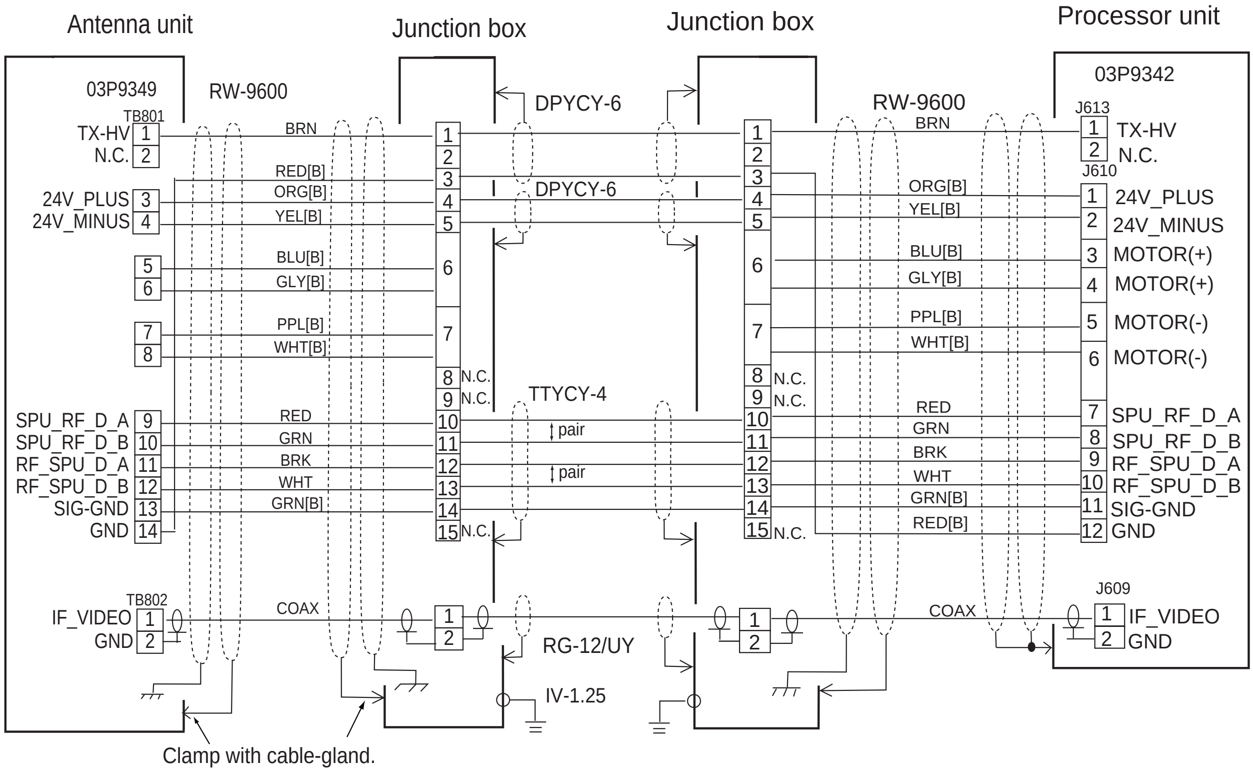
Connection

Insert each cable to the cable gland as follows.



Connect each cable cores to the terminal board, referring to the interconnection diagram on next page.





Antenna unit
Junction box
Junction box
Processor unit
03P9349
RW-9600
TB801
TX-HV
N.C.
24V_PLUS
24V_MINUS
SPU_RF_D_A
SPU_RF_D_B
RF_SPU_D_A
RF_SPU_D_B
SIG-GND
GND
BRN
RED[B]
ORG[B]
YEL[B]
BLU[B]
GLY[B]
PPL[B]
WHT[B]
RED
GRN
BRK
WHT
GRN[B]
DPYCY-6
DPYCY-6
TTYCY-4
pair
pair
N.C.
RW-9600
03P9342
J613
J610
MOTOR(+)
MOTOR(-)
TB802
IF_VIDEO
COAX
J609
RG-12/UY
IV-1.25
Clamp with cable-gland.

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5. INPUT/OUTPUT DATA

Input and output data are shown in the table below.

Note: This radar accepts position data fixed by WGS-84 geodetic datum only. Set the datum to WGS-84 on the EPFS (GPS, etc.) connected to this radar. If other type of datum is input, the error message "DATUM" appears and the AIS feature is inoperative. Baud rate for the serial input is automatically set to 4800, 9600, 19200 or 38400 as appropriate.

Input

Data	Specifications	Contents	Remarks
Heading signal	synchro or step	GC-10 required	AD-10 and IEC 61162 are switched by menu setting.
	AD-10 format	External AD-100	
	IEC 61162-2**		
Speed signal	IEC 61162-1		
Navaid data	IEC 61162-1	Position, course, speed, waypoint, route, time, wind data, current data, depth, temperature, roll, pitch	For IMO spec, IEC-61162-1 Edition 2 is required.
External radar signal	Heading, Bearing, Trigger, Video	No STC control	Operate as remote display
Alarm ACK input	Contact closure		Input from alarm system
	IEC61162-1	ACK	Input from alarm system
Track Control unit	RS-422		Option

Output

Data	Specifications	Contents	Remarks
Radar system data	RS-232C	RSD, OSD, TLL,	For PC plotter
TT data*	IEC 61162-1	TTD, TTM, TLB	For ECDIS
ALARM data	IEC 61162-1	ALR	For ALARM system
Remote display signal	HD, BP Trigger, Video		2 ports
External LCD monitor signal	DVI	Same as main display unit	2 systems in total
External CRT monitor signal	R, G, B, H, V	Same as main display unit	Option
Alarm signal	Contact closure	Output to alarm system by using photo-relay	4 systems, Output contents are selected by menu.

*The output sentence, mode and baud rate can be set at the TT Preset menu.
**Data cycle should be input with more than 40 Hz (HSC) or 20 Hz (normal speed).

IEC 61162 input sentence and priority

Contents	Sentence and priority
Speed (STW)	VBW>VHW
Speed (SOG)	VBW
Speed (position)	VTG>RMC
Heading (True)	THS*>HDT*
Position	GNS>GGA>RMC>GLL
Datum	DTM
Waypoint	BWR, BWC, RMB
Route	WPL, RTE
Date, Time	ZDA
Depth	DPT >DBT>DBS>DBK
Temperature	MTW
Wind	MWV>VWT>VWR
Set and Drift	VDR
ALARM ACK	ACK

*: THS and HDT are IEC61162-2
Others: IEC61162-1 ed2.

IEC 61162 output sentence

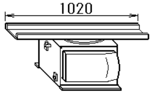
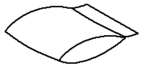
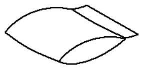
Contents	Sentence
Target L/L	TLL *
Radar system data	RSD
Own ship data	OSD
TT target data	TTD, TLB, TTM
ALARM data	ALR

*non IMO-type only.

PACKING LIST

03G0-X-9851 -0　1/1

RSB-098-080/RSB-099-080/RSB-100-080/RSB-101-080/RSB-102-080

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット　UNIT			
空中線本体部 ANTENNA CHASSIS		RSB-098-080-* 008-538-770**	1
付属品　ACCESSORIES			
付属品 ACCESSORIES		FP03-10101 008-538-730	1
工事材料　INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP03-27201 008-538-720	1

1.ｺｰﾄﾞ番号末尾の[**]は、選択品の代表型式/ｺｰﾄﾞを表します。
CODE NUMBER ENDED BY "**" INDICATES THE NUMBER OF TYPICAL MATERIAL.

(略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

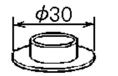
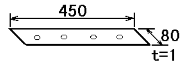
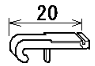
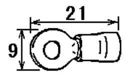
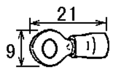
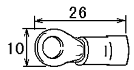
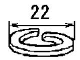
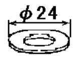
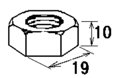
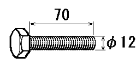
03G0-X-9851

FURUNO

CODE NO.	008-551-450-00	03G0-X-9401 -8
TYPE	CP03-27201	1/2

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	シールワッシャー SEAL WASHER		03-001-3002-0 ROHS CODE NO. 300-130-020-10	8	
2	防蝕ゴム ANTI-CORROSION RUBBER		03-029-0301-2 ROHS CODE NO. 100-091-112-10	2	
3	操作ﾚﾊﾞｰ TERMINAL OPENER		231-131 CODE NO. 000-165-800-10	1	
4	圧着端子 CRIMP-ON LUG		FV2-3 CODE NO. 000-157-246-10	2	
5	圧着端子 CRIMP-ON LUG		FV2-4 CODE NO. 000-157-247-10	3	
6	圧着端子 CRIMP-ON LUG		FV5.5-4(LF) CODE NO. 000-166-744-10	1	
7	ﾊﾞﾈ座金 SPRING WASHER		M12 SUS304 CODE NO. 000-167-397-10	8	
8	ﾐｶﾞｷﾏﾙ平座金 FLAT WASHER		M12 SUS304 CODE NO. 000-167-446-10	8	
9	六角ﾅｯﾄ 1ｼｭ HEXAGONAL NUT		M12 SUS304 CODE NO. 000-167-491-10	16	
10	六角ﾎﾞﾙﾄ 全ﾈｼﾞ HEXAGON HEAD SCREW		M12X70 SUS304 CODE NO. 000-162-814-10	8	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM.　THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO., LTD.

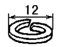
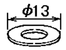
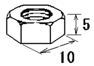
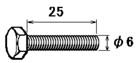
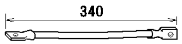
03G0-X-9401

FURUNO

CODE NO.	008-551-450-00	03GO-X-9401 -8
TYPE	CP03-27201	2/2

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
11	ﾊﾞﾈ座金 SPRING WASHER		M6 SUS304 CODE NO. 000-158-855-10	1	
12	ﾐｶﾞｷ平座金 FLAT WASHER		M6 SUS304 CODE NO. 000-158-854-10	3	
13	六角ﾅｯﾄ 1ｼｭ HEXAGONAL NUT		M6 SUS304 CODE NO. 000-158-856-10	1	
14	六角ﾎﾞﾙﾄ HEXAGONAL HEAD BOLT		M6X25 SUS304 CODE NO. 000-162-871-10	1	
15	ｹｰﾌﾞﾙ組品 CABLE ASSY.		RW-4747 RW-4747-1 CODE NO. 000-566-000-12 000-566-000-01	1	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

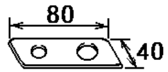
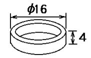
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	008-538-730-00	03GO-X-9501 -1
TYPE	FP03-10101	1/1

付属品表

ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	吊り上げ金具 LIFTING FIXTURE		03-015-3233-0 ROHS CODE NO. 100-090-720-10	2	
2	取付用ｶﾗｰ COLLAR FOR LIFTING FIXTURE		03-015-3234-0 ROHS CODE NO. 100-090-730-10	2	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

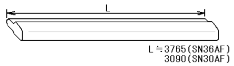
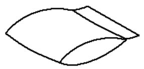
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

PACKING LIST

03FT-X-9851 -0　1/1

SN30AF/SN36AF

A-4

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット　UNIT			
アンテナ組品 ANTENNA		SN30AF 008-505-950**	1
アンテナ工材　ANTENNA INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		SN5AF/7AF/30AF/36AF 008-254-590	1

1.コード番号末尾の[**]は、選択品の代表型式/コードを表します。
CODE NUMBER ENDED BY "**" INDICATES THE NUMBER OF TYPICAL MATERIAL.

(略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

03FT-X-9851

A-5

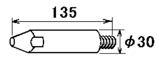
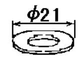
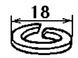
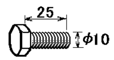
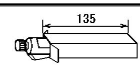
FURUNO

CODE NO.	008-254-590-00	03CQ-X-9421 -5
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

SN5AF/7AF/7AF-MSA/30AF/36AF

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ピン GUIDE PIN		03-006-4081-0 ROHS CODE NO. 300-640-810-10	2	
2	Oリング O-RING		JB1AG-60 CODE NO. 000-851-309-00	2	
3	ミガキ平座金 FLAT WASHER		M10 SUS304 CODE NO. 000-167-232-10	10	
4	バネ座金 SPRING WASHER		M10 SUS304 CODE NO. 000-167-233-10	10	
5	六角ボルト HEXAGONAL HEAD BOLT		M10X25　SUS304 CODE NO. 000-162-780-10	10	
6	ケミシール SILICON RUBBER		S-8400W アルミチューブ 50G S-8400W アルミチューブ 50G CODE NO. 000-158-483-10 000-158-483-00	1	

型式/コード番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM.　THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO., LTD.

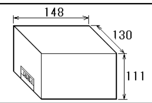
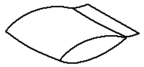
03CQ-X-9421

PACKING LIST

03GO-X-9853 -0 1/1

PSU-007-*-*-*

A-6

N A M E	O U T L I N E	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
電源制御部 POWER CONTROL UNIT		PSU-007-70-23-S 000-081-241 **	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP03-27301 008-538-740	1

1.ｺｰﾄﾞ番号末尾の[**]は、選択品の代表型式/ｺｰﾄﾞを表します。
CODE NUMBER ENDED BY "**" INDICATES THE NUMBER OF TYPICAL MATERIAL.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

03GO-X-9853

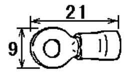
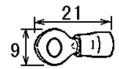
A-7

FURUNO

CODE NO.	008-538-740-00	03GO-X-9402 -1
TYPE	CP03-27301	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	圧着端子 CRIMP-ON LUG		FV2-3 CODE NO. 000-157-246-10	2	
2	圧着端子 CRIMP-ON LUG		FV2-4 FV2-4 ｱｵ CODE NO. 000-157-247-10 000-538-118-00	6	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

03GO-X-9402

FURUNO

CODE NO.		03GL-X-9401 -6
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

FAR-21**/28**, FCR-21**/28**

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｹｰﾌﾞﾙ(14C) 14-CORE CABLE	L=15M	RW-9600 *15M* CODE NO. 001-078-400-10	1	選択 TO BE SELECTED 信号ｹｰﾌﾞﾙ SIGNAL CABLE
2	ｹｰﾌﾞﾙ(14C) 14-CORE CABLE	L=30M	RW-9600 *30M* CODE NO. 001-078-410-10	1	選択 TO BE SELECTED 信号ｹｰﾌﾞﾙ SIGNAL CABLE
3	ｹｰﾌﾞﾙ(14C) 14-CORE CABLE	L=40M	RW-9600 *40M* CODE NO. 001-078-420-10	1	選択 TO BE SELECTED 信号ｹｰﾌﾞﾙ SIGNAL CABLE
4	ｹｰﾌﾞﾙ(14C) 14-CORE CABLE	L=50M	RW-9600 *50M* CODE NO. 001-078-430-10	1	選択 TO BE SELECTED 信号ｹｰﾌﾞﾙ SIGNAL CABLE

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

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（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO., LTD.

PACKING LIST

03GL-X-9855 -5　1/1

MU-201CR-*

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット　UNIT			
表示部 DISPLAY UNIT	534 × 454	MU-201CR-**-S/**-HK-AT 000-083-054-00 **	1
予備品　SPARE PARTS			
予備品 SPARE PARTS		SP03-03900 000-081-063-00	1 DC用
予備品　SPARE PARTS			
予備品 SPARE PARTS		SP03-14401 008-535-990-00	1 AC用
付属品　ACCESSORIES			
付属品 ACCESSORIES		FP03-09810 008-536-010-00	1
工事材料　INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品 CABLE ASSEMBLY	L=5M	DVI-D/D S-LINK 5M 001-132-960-10	1

1.ｺｰﾄﾞ末尾に[**]の付いたﾕﾆｯﾄは代表の型式/ｺｰﾄﾞを表示しています。
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.
2.予備品は、AC用,DC用で選択願います。
CHOOSE SPARE PARTS DEPENDING ON AC OR DC POWER.

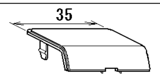
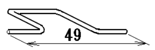
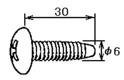
型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

A-10

CODE NO.	008-536-010-00	03GL-X-9504 -4 1/1
TYPE	FP03-09810	

付属品表

ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾊﾟﾈﾙｶﾊﾞｰ PANEL COVER		03-163-1101-1 ROHS / CODE NO. 100-305-111-10	4	表示部用 FOR DISPLAY UNIT
2	ﾊﾟﾈﾙﾌｯｸ PANEL HOOK		03-163-1102-0 ROHS / 03-163-1102-0 / CODE NO. 100-305-120-10 / 100-305-120-00	2	表示部用 FOR DISPLAY UNIT
3	+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ 1ｼｭ SELF-TAPPING SCREW		6X30 SUS304 / CODE NO. 000-162-614-10	4	表示部用 FOR DISPLAY UNIT

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FURUNO ELECTRIC CO ., LTD.

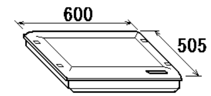
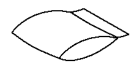
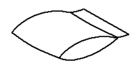
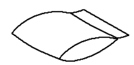
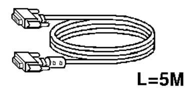
03GL-X-9504

PACKING LIST

03GM-X-9851 -4 1/1

MU-231CR-*

A-11

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
表示部 DISPLAY UNIT		MU-231CR-*-S/-*-HK-AR / 000-080-430-00 **	1
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP03-14401 / 008-535-990-00	1 AC用
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP03-14402 / 008-536-000-00	1 DC用
付属品 ACCESSORIES			
付属品 ACCESSORIES		FP03-09810 / 008-536-010-00	1
工事材料 INSTALLATION MATERIALS			
ｹｰﾌﾞﾙ組品 CABLE ASSEMBLY		DVI-D/D S-LINK 5M / 001-132-960-10	1

1.ｺｰﾄﾞ末尾に[**]の付いたﾕﾆｯﾄは代表の型式/ｺｰﾄﾞを表示しています。
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.
2.予備品は、AC,DCで選択願います。
CHOOSE SPARE PARTS DEPENDING ON AC OR DC POWER.

型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
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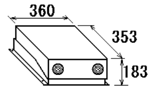
03GM-X-9851

PACKING LIST

03GL-X-9858 -7 1/1

RPU-013

A-12

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
制御部 PROCESSOR UNIT		RPU-013* 000-081-381-00 **	1
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP03-14404 008-535-910-00	1 (*1)
予備品 SPARE PARTS		SP03-14405 008-535-920-00	1 (*1)
予備品 SPARE PARTS		SP03-14406 008-535-930-00	1 (*1)
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP03-25602 008-535-940-00	1 (*2)
工事材料 INSTALLATION MATERIALS		CP03-25603 008-535-950-00	1 (*2)
図書 DOCUMENT			
取扱説明書 OPERATOR'S MANUAL	210 × 297	OM*-35190-* 000-147-451-1* **	1
取扱説明書 OPERATOR'S MANUAL	210 × 297	OM*-35221-* 000-164-255-1* **	1 (*3)
装備要領書 INSTALLATION MANUAL	210 × 297	IM*-35***-* 000-148-692-1* **	1
操作要領書 OPERATOR'S GUIDE	210 × 297	OS*-35190-* 000-153-046-1* **	1

1.ｺｰﾄﾞ番号末尾の[**]は、選択品の代表ｺｰﾄﾞを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

2.(*1)(*2)は、それぞれ仕様選択品を表します。
(*1)(*2)INDICATE SPECIFICATION SELECTIVE ITEM.

3.(*3) FAR-2157/2167DS仕様の時のみ添付されます。
SUPPLYED WITH FAR-2157/2167DS ONLY.

型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

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03GL-X-9858

A-13

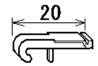
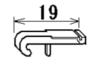
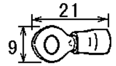
FURUNO

CODE NO.	008-535-940-00	03GL-X-9405 -2
TYPE	CP03-25602	1/1

工事材料表

INSTALLATION MATERIALS

AC用

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	操作ﾚﾊﾞｰ TERMINAL OPENER		231-131 CODE NO. 000-165-800-10	1	制御部用 FOR PROCESSOR UNIT
2	操作ﾚﾊﾞｰ TERMINAL OPENER		734-230 CODE NO. 000-147-417-10	1	制御部用 FOR PROCESSOR UNIT
3	圧着端子 CRIMP-ON LUG		FV2-4 CODE NO. 000-157-247-10	2	制御部用 FOR PROCESSOR UNIT

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

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FURUNO ELECTRIC CO., LTD.

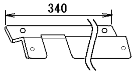
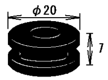
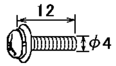
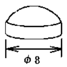
03GL-X-9405

FURUNO

CODE NO.	008-535-610-00	03GL-X-9505 -7
TYPE	FP03-09850	1/1

付属品表

ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	KB直付金具 KB FIXING METAL		03-163-7521-1 ROHS CODE NO. 100-306-251-10	1	操作部用 FOR CONTROL UNIT
2	ｸﾞﾛﾒｯﾄ GROMMET		G-39 CODE NO. 000-166-401-10	1	操作部用 FOR CONTROL UNIT
3	+-ﾅﾍﾞｾﾑｽB WASHER HEAD SDREW *B*		M4X12 C2700W MBNI2 CODE NO. 000-163-192-10	2	操作部用 FOR CONTROL UNIT
4	ｸﾘｱﾊﾞﾝﾎﾟﾝ CUSHION		TM-180-302 CODE NO. 000-166-468-10	3	操作部用 FOR CONTROL UNIT

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

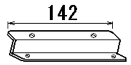
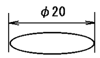
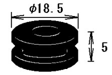
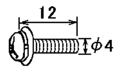
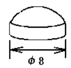
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FURUNO

CODE NO.	008-535-690-00	03GL-X-9506 -7
TYPE	FP03-09860	1/1

付属品表

ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	KB直付金具(T) KEYBOARD FIXTURE		03-163-7821-1 ROHS CODE NO. 100-306-291-10	1	操作部用 FOR CONTROL UNIT
2	ﾌﾞﾗｲﾝﾄﾞｼｰﾙ BLIND SEAL		22-020-1005-1 ROHS CODE NO. 100-173-591-10	3	操作部用 FOR CONTROL UNIT
3	ｸﾞﾛﾒｯﾄ GROMMET		G-49 CODE NO. 000-166-406-10	1	操作部用 FOR CONTROL UNIT
4	+-ﾅﾍﾞｾﾑｽB WASHER HEAD SDREW *B*		M4X12 C2700W MBNI2 CODE NO. 000-163-192-10	2	操作部用 FOR CONTROL UNIT
5	ｸﾘｱﾊﾞﾝﾎﾟﾝ RUBBER FOOT		TM-180-302 CODE NO. 000-166-468-10	2	操作部用 FOR CONTROL UNIT

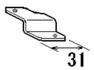
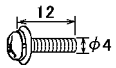
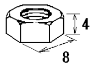
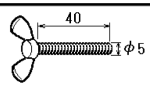
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FURUNO

CODE NO.	008-535-630-00	03GL-X-9503 -6
TYPE	FP03-09870	1/1

付属品表
ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾌﾗｯｼｭﾏｳﾝﾄ金具 FLUSH MOUNTING PLATE		03-163-7531-1 ROHS CODE NO. 100-306-261-10	4	
2	ﾄｰﾅﾍﾞｾﾑｽB WASHER HEAD SDREW *B*		M4X12 C2700W MBNI2 CODE NO. 000-163-192-10	4	
3	六角ﾅｯﾄ　1種 HEX.NUT		M5 SUS304 CODE NO. 000-165-921-10	4	
4	蝶ﾎﾞﾙﾄ WING SCREW		M5X40 SUS304 CODE NO. 000-162-682-10	4	

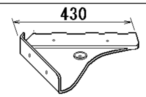
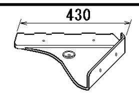
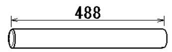
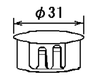
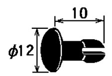
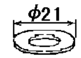
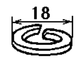
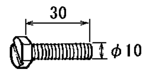
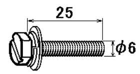
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FURUNO

CODE NO.	008-535-560-00	03GL-X-9501 -5
TYPE	FP03-09820	1/1

付属品表
ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾊﾝｶﾞｰL(20) HANGER L		03-163-1111-1 ROHS 03-163-1111-1 CODE NO. 100-305-141-10 100-305-141-00	1	
2	ﾊﾝｶﾞｰR(20) HANGER R		03-163-1112-1 ROHS 03-163-1112-1 CODE NO. 100-305-181-10 100-305-181-00	1	
3	ﾊﾝｶﾞｰｻｻｴ(20) HANGER STAY		03-163-1113-1 ROHS CODE NO. 100-305-191-10	1	
4	ﾎｰﾙﾌﾟﾗｸﾞ HOLE PLUG		CP-30-HP-13 CODE NO. 000-160-074-10	2	
5	ｽﾅｯﾌﾟﾎﾞﾀﾝ SNAP BUTTON		KB-13ﾖｳ　ﾎﾞﾀﾝｸﾛ CODE NO. 000-570-276-10	4	
6	ﾐｶﾞｷ平座金 FLAT WASHER		M10 SUS304 CODE NO. 000-167-232-10	2	
7	ﾊﾞﾈ座金 SPRING WASHER		M10 SUS304 CODE NO. 000-167-233-10	2	
8	六角ｽﾘﾜﾘ　ﾎﾞﾙﾄ HEX.BOLT		M10X30 SUS304 CODE NO. 000-162-884-10	2	
9	六角ｽﾘﾜﾘ ｾﾑｽB HEX.BOLT (SLOTTED,WASHER HEAD)		M6X25 SUS304 CODE NO. 000-162-949-10	4	

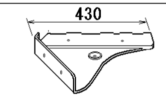
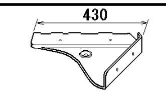
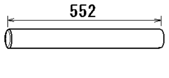
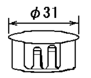
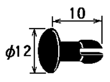
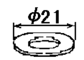
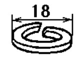
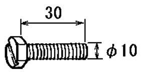
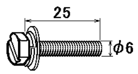
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	008-536-020-00	03GM-X-9501 -5
TYPE	FP03-09830	1/1

付属品表
ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾊﾝｶﾞｰL(20) HANGER L		03-163-1111-1 ROHS 03-163-1111-1 CODE NO. 100-305-141-10 100-305-141-00	1	
2	ﾊﾝｶﾞｰR(20) HANGER R		03-163-1112-1 ROHS 03-163-1112-1 CODE NO. 100-305-181-10 100-305-181-00	1	
3	ﾊﾝｶﾞｰｻｻｴ(23) HANGER STAY		03-163-2071-1 ROHS CODE NO. 100-305-371-10	1	
4	ﾎｰﾙﾌﾟﾗｸﾞ HOLE PLUG		CP-30-HP-13 CODE NO. 000-160-074-10	2	
5	ｽﾅｯﾌﾟﾎﾞﾀﾝ SNAP BUTTON		KB-13ﾖｳ ﾎﾞﾀﾝｸﾛ CODE NO. 000-570-276-10	4	
6	ﾐｶﾞｷ平座金 FLAT WASHER		M10 SUS304 CODE NO. 000-167-232-10	2	
7	ﾊﾞﾈ座金 SPRING WASHER		M10 SUS304 CODE NO. 000-167-233-10	2	
8	六角ｽﾘﾜﾘ ﾎﾞﾙﾄ HEX. BOLT		M10X30 SUS304 CODE NO. 000-162-884-10	2	
9	六角ｽﾘﾜﾘ ｾﾑｽB HEX. BOLT (SLOTTED, WASHER HEAD)		M6X25 SUS304 CODE NO. 000-162-949-10	4	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

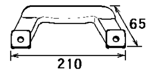
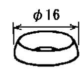
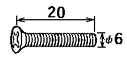
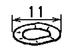
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（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO ., LTD. 03GM-X-9501

FURUNO

CODE NO.	008-535-570-00	03GL-X-9502 -3
TYPE	FP03-09840	1/1

付属品表
ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	取手 HANDLE		14-002-1125-2 ROHS CODE NO. 840-211-252-10	2	
2	ﾛｰｾﾞｯﾄ座金 ROSETTE WASHER		M6 C2700W ﾎﾞﾘｼｰﾙ M6 C2700W ﾎﾞﾘｼｰﾙ CODE NO. 000-165-694-10 000-864-910-00	4	
3	+丸皿小ﾈｼﾞ OVAL HEAD SCREW		M6X20 C2700W ﾎﾞﾘｼｰﾙ CODE NO. 000-163-677-10	4	
4	波座金 WAVE WASHER		WW-6 SUS CODE NO. 000-167-384-10	4	

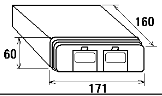
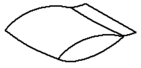
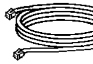
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

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FURUNO ELECTRIC CO ., LTD. 03GL-X-9502

PACKING LIST

CU-200-FAR

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
メモリーカードインターフェイス MEMORY CARD INTERFACE		CU-200 000-081-569-00	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP03-27431 008-544-400-00	1
その他工材 OTHER INSTALLATION MATERIALS			
ケーブル組品 CABLE ASSY.		P5E-4PTX-BL P5E-4PTX-BL 000-164-637-10 000-147-510-00	1
ケーブル組品MJ CABLE ASSY.		MJ-A3SPF0015-100C 000-156-054-11	1

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

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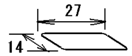
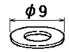
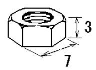
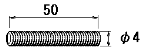
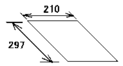
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-544-400-00	03GO-X-9404 -6
TYPE	CP03-27431	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	舵輪貼りマーク(BSH) STEERING WHEEL LABEL		03-801-0851-4 CODE NO. 100-277-724-10	1	
2	バネ座金 SPRING WASHER		M4 SUS304 CODE NO. 000-167-405-10	4	
3	ミガキ丸平座金 FLAT WASHER		M4 SUS304 CODE NO. 000-167-455-10	4	
4	六角ナット 1シュ HEX. NUT		M4 SUS304 CODE NO. 000-167-488-10	4	
5	寸切ボルト THREADED ROD		M4X50 SUS304 CODE NO. 000-162-679-10	4	
6	舵輪マーク貼付要領 LABEL ATTACHING PROCEDURE		C32-00407-* ワ/エイ CODE NO. 000-150-918-1*	1	

型式/コード番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

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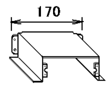
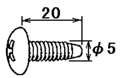
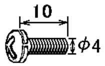
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO ., LTD.

FURUNO

CODE NO.	008-539-530-00	03G0-X-9502 -3
TYPE	FP03-10201	1/1

付属品表
ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾊﾝｶﾞｰ MOUNTING BRACKET		19-023-3081-0 CODE NO. 100-316-250-10	1	
2	+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ 1ｼｭ SELF-TAPPING SCREW		5X20 SUS304 CODE NO. 000-162-608-10	4	
3	+ｰﾅﾍﾞｾﾑｽA WASHER HEAD SCREW		M4X10 C2700W MBNI2 CODE NO. 000-163-167-10	4	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

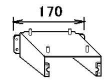
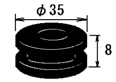
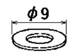
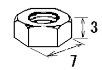
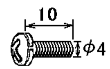
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FURUNO ELECTRIC CO ., LTD.　　03G0-X-9502

FURUNO

CODE NO.	008-539-540-00	03G0-X-9503 -6
TYPE	FP03-10202	1/1

付属品表
ACCESSORIES

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｺﾝｿｰﾙﾖｳ取付材 MOUNTING BRACKET		19-023-3091-0 ROHS CODE NO. 100-316-260-10	1	
2	ｸﾞﾛﾒｯﾄ GROMMET		C-30-NG-79-Q-EP-UL CODE NO. 000-173-345-10	1	
3	ﾊﾞﾈ座金 SPRING WASHER		M4 SUS304 CODE NO. 000-167-405-10	4	
4	ﾐｶﾞｷ丸平座金 FLAT WASHER		M4 SUS304 CODE NO. 000-167-455-10	4	
5	六角ﾅｯﾄ 1ｼｭ HEX. NUT		M4 SUS304 CODE NO. 000-167-488-10	4	
6	+ｰﾅﾍﾞｾﾑｽA WASHER HEAD SCREW		M4X10 C2700W MBNI2 CODE NO. 000-163-167-10	4	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

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FURUNO ELECTRIC CO ., LTD.　　03G0-X-9503

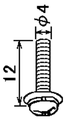
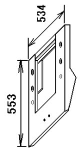
A-25

FURUNO

工事材料表

INSTALLATION MATERIALS

CODE NO.	008-535-640-00	03GL-X-9408 -6	1/1
TYPE	0P03-183		

番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	+-ナベセムスB WASHER HEAD SDREW *B*		M4X12 C2700W MBNI2 CODE NO. 000-163-192-10	4	
2	連結台(20)組品 COUPLING PLATE ASSY.		0P03-183-1 CODE NO. 008-536-980-00	1	

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

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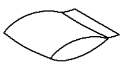
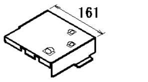
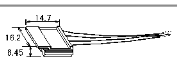
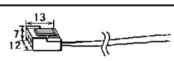
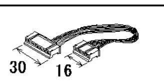
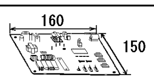
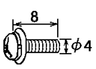
FURUNO ELECTRIC CO., LTD.

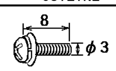
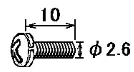
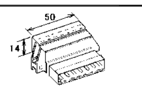
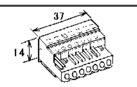
03GL-X-9408

A-24

PACKING LIST GC-10-2

03GL-X-9852-4 1/1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP03-13300 008-419-280-00	1
その他部品 OTHER PARTS			
GCｶﾊﾞｰ組品 GC COVER ASSY.		80-0665 008-537-030-00	1
NHｺﾈｸﾀ NH CONNECTOR ASSY.		03-2091(5P) 008-534-670-00	1
VHｺﾈｸﾀ VH CONNECTOR ASSY.		03-2090(3P) 008-534-660-00	1
VHｺﾈｸﾀ VH CONNECTOR ASSY.		03-2089(5P) 008-534-650-00	1
XH-PHｺﾈｸﾀ XH-PH CONNECTOR ASSY.		03-2088(6-14P) 008-534-640-00	1
演算ﾌﾟﾘﾝﾄ PROCESSOR BOARD		64P1106A(LF) 004-655-920-00	1
+-ﾅﾍﾞｾﾑｽB WASHER HEAD SCREW(B)		M4X8 C2700W MBNI2 000-163-200-10	3

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
+-ﾅﾍﾞｾﾑｽB WASHER HEAD SCREW		M3X8 C2700W MBNI2 000-163-190-10	5
+ﾅﾍﾞｾﾑｽA WASHER HEAD SCREW		M2.6X10 C2700W MBNI2 000-163-477-10	2
ｺﾈｸﾀ(231) CONNECTOR		231-607/019-FUR 000-147-414-11	1
ｺﾈｸﾀ(231) CONNECTOR		231-107/026-FUR 000-147-413-11	1

(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

03GL-X-9852

A-26

FURUNO

CODE NO.	008-535-650-00	03GL-X-9409 -6
TYPE	0P03-184	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｻｰﾅﾍﾞｾﾑｽB WASHER HEAD SDREW *B*	12, φ4	M4X12 C2700W MBNI2 CODE NO. 000-163-192-10	4	
2	連結台(23)組品 COUPLING PLATE ASSY.	553, 600	0P03-184-1 CODE NO. 008-536-990-00	1	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO., LTD.

03GL-X-9409

PACKING LIST

03GL-X-9861 -9　1/1

0P03-180-2

A-27

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
その他部品 OTHER PARTS			
ｻｰﾅﾍﾞｾﾑｽB WASHER HEAD SCREW	8, φ3	M3X8 C2700W MBNI2 000-163-190-10	10
DVI-RGB組品 DVI-RGB ASSY.	190, 90	SLB-FRN4-A 008-537-660-00	1
RGB-BUFFﾌﾟﾘﾝﾄ RGB-BUFF BOARD	44, 75	03P9229B(LF) 008-554-940-00	1
VHｺﾈｸﾀ VH CONNECTOR	24	03-2092(6P) 008-534-690-00	1
XHｺﾈｸﾀ XH CONNECTOR	8	03-2093(3P) 008-534-700-00	1
XHｺﾈｸﾀ XH CONNECTOR	34, 26	03-2094(13-10P) 008-534-710-00	1
ｹｰﾌﾞﾙ組品 CABLE ASSY.	L=0.85M	DVI-D/D S-LINK 0.85M DVI-D/D S-LINK 0.85M 000-148-644-11 000-148-644-00	1
ｽﾍﾟｰｻｰ SPACER	41, 5.5	SQ-35 000-159-310-10	6
ﾊﾞﾈｻﾞｶﾞﾈ SPRING WASHER	6	M3　C5191W 000-168-187-10	6

型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

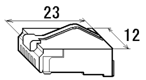
03GL-X-9861

FURUNO

CODE NO.	008-542-460-00	03GL-X-9407 -4
TYPE	CP03-28901	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｺﾈｸﾀ(ﾓｼﾞｭﾗｰ) MODULAR CONNCTOR		MPS588-C CODE NO. 000-166-044-10	2	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

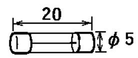
FURUNO ELECTRIC CO ., LTD.

03GL-X-9407

For display unit (MU-201CR/231CR, AC set)

CODE NO.	008-535-990	03GL-X-9303 -1 1/1
TYPE	SP03-14401	BOX NO. P

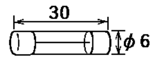
SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE		FGMB 250V 2A PBF FGMB 2A 250V			2	表示部用 FOR DISPLAY UNIT 000-157-497-10 000-122-000-00

For processor unit (100 VAC set)

CODE NO.	008-535-910	03GL-X-9305 -1 1/1
TYPE	SP03-14404	BOX NO. P

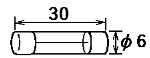
SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE		FGBO 125V 10A PBF			4	AC100用 FOR PROCESSOR UNIT 000-155-826-10

For processor unit (220 VAC set)

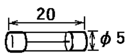
CODE NO.	008-535-920-00	03GL-X-9306 -1 1/1
TYPE	SP03-14405	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE		FGBO 250V 5A PBF			4	AC220用 FOR PROCESSOR UNIT 000-155-840-10

CODE NO.	008-419-280-00	03GL-X-9302 -2 1/1
TYPE	SP03-13300	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	QUANTITY SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ FUSE		FGMB 250V 2A PBF FGMB 2A 250V			8	000-157-497-10 000-122-000-00

FURUNO

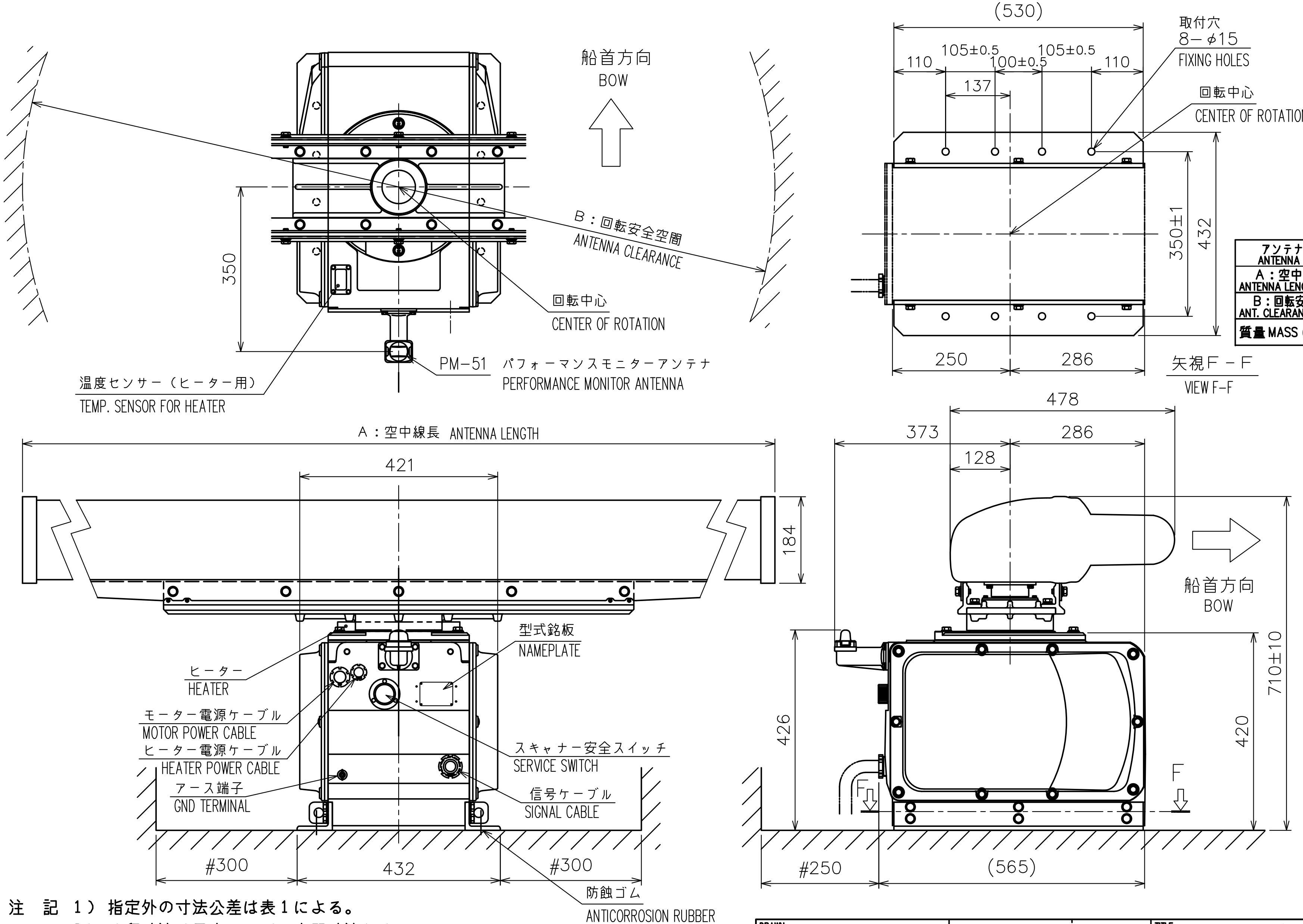


表 1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3
500<L≦1000	±4
1000<L≦2000	±5
2000<L≦4000	±7

表2 TABLE 2

アンテナ型式 ANTENNA TYPE	SN36AF	SN30AF
A：空中線長 ANTENNA LENGTH (mm)	3765±10	3090±10
B：回転安全空間 ANT. CLEARANCE (mm)	3860	3200
質量 MASS (kg±10%)	142	135

注　記 1）指定外の寸法公差は表1による。
2）＃印寸法は最小サービス空間寸法とする。
3）取付用ネジはM12ボルトを使用のこと。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE M12 BOLTS FOR FIXING THE UNIT.

DRAWN	3/Feb/2011 T.YAMASAKI	TITLE	RSB-098/099/100/101/102
CHECKED	3/Feb/2011 H.MAKI	名称	空中線部（PM-51，氷結防止付）
APPROVED	14/Feb/2011 Y.NISHIYAMA	FAR-2137S/2837S	外寸図
SCALE	1/12 MASS 表2参照 SEE TABLE 2	NAME	ANTENNA UNIT (W/PM-51, DE-ICER)
DWG.No.	C3526-G01-E REF.No. 03-163-300G-7		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

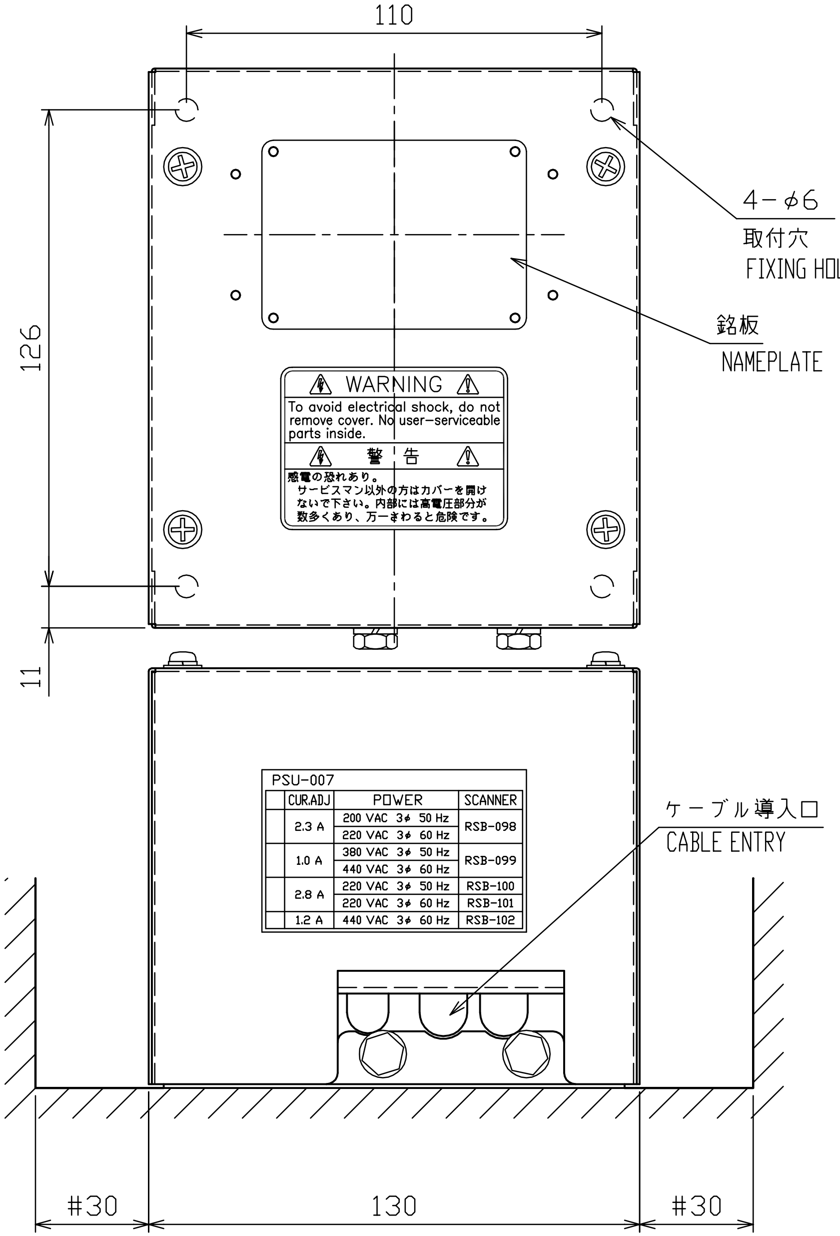
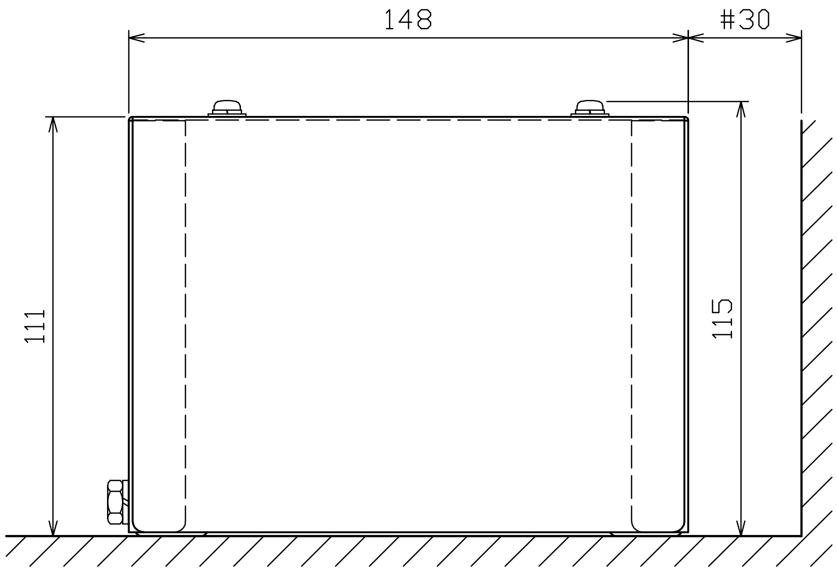


表 1 TABLE 1

寸法区分（ｍｍ） DIMENSIONS	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３

注　記　１）　＃印寸法は最小サービス空間寸法とする。
２）　指定外の寸法公差は表１による。
３）　取付にはトラスタッピンネジ呼び径５×２０を使用のこと。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 5X20 FOR FIXING THE UNIT.

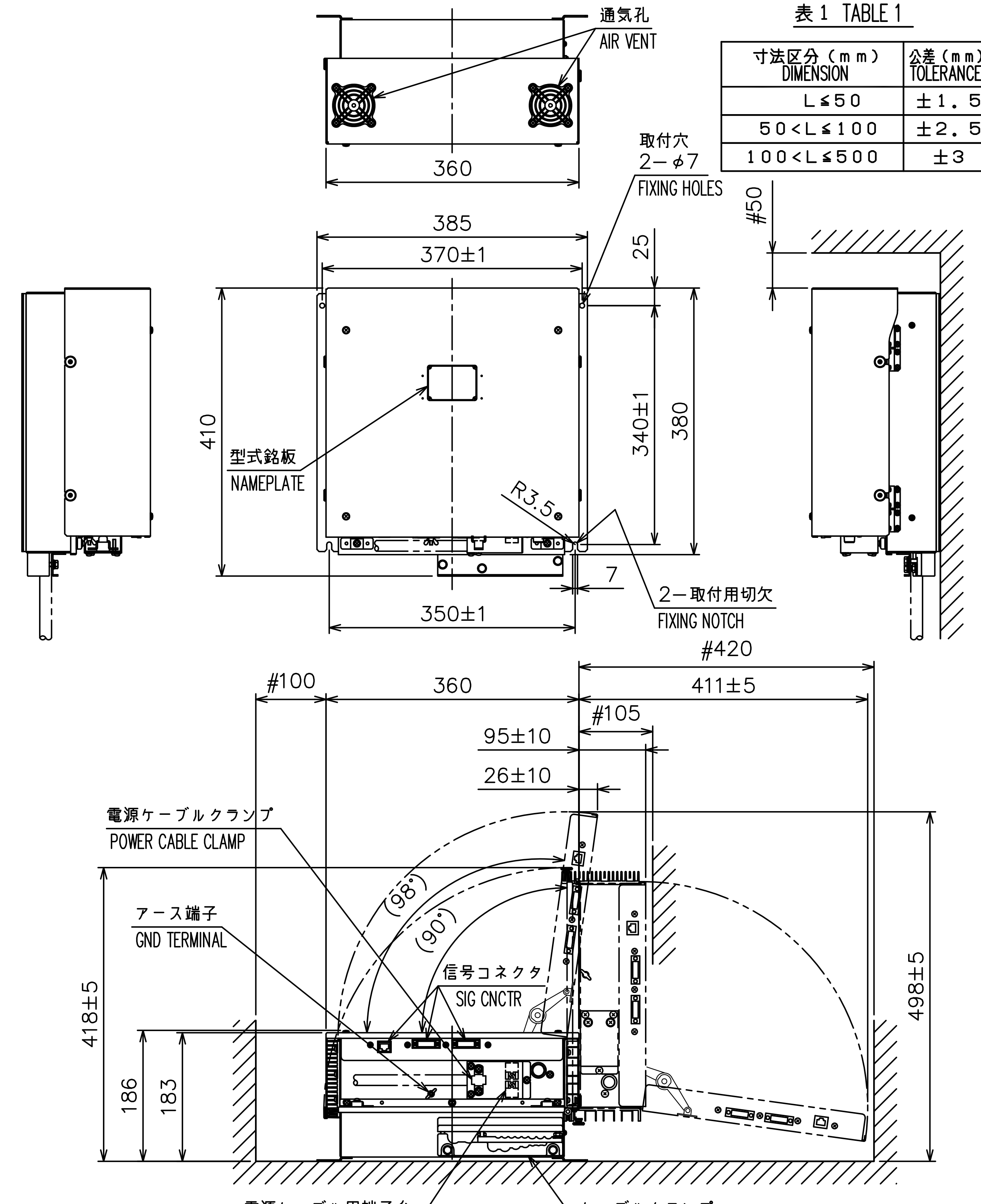


DRAWN Apr. 28 '04	E. MIYOSHI	TITLE	PSU-007
CHECKED	TAKAHASHI. T	名称	電源制御部
APPROVED	Y. Hatai	FAR-2137S/2837S	外寸図
SCALE 1/2	MASS 0.9 kg ±10%	NAME	POWER SUPPLY UNIT
DWG No.	C3521-G01- B	03-163-330G-1	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

表１ TABLE 1

寸法区分（ｍｍ） DIMENSION	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３



注　記

１）＃印寸法は最小サービス空間寸法とする。
２）指定外の寸法公差は表１による。
３）取付用ネジはＭ６ボルト、またはコーチボルト呼び径６を使用のこと。

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M6 BOLTS OR COACH SCREWS φ6 FOR FIXING THE UNIT.

DRAWN May 15 '07 T.YAMASAKI		TITLE RPU-013/016
CHECKED May 15 '07 T.TAKENO		名称 制御部 外寸図
APPROVED May 17'07 R.Esumi	FCR-2117 SER. FAR-2117 SER.	
SCALE 1/8	MASS 10 ±10% kg	NAME PROCESSOR UNIT OUTLINE DRAWING
DWG. No. C3519-G03- D	REF. No. 03-163-800G-3	

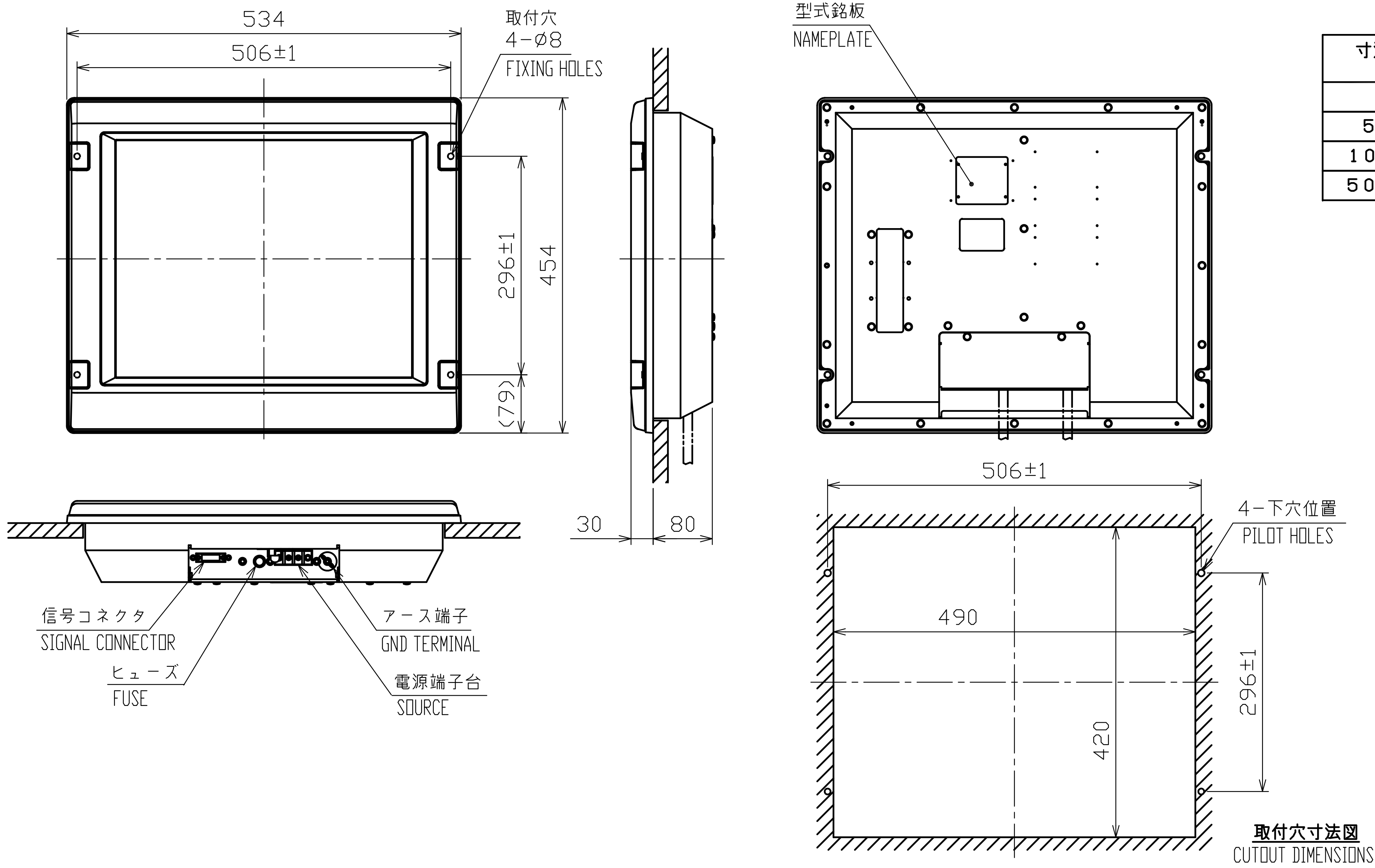


表 1 TABLE 1

寸法区分（ｍｍ） DIMENSIONS	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３
５００＜Ｌ≦１０００	±４

注　記　１）指定外の寸法公差は表１による。
　　　　２）取付には＋トラスタッピンネジ呼び径６Ｘ３０を使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE TAPPING SCREWS Ø6x30 FOR FIXING THE UNIT.

DRAWN 1/Sep/2010 T.YAMASAKI		TITLE	MU-201CR
CHECKED 1/Sep/2010 T.TAKAHASHI		名称	表示部（埋込装備）
APPROVED 1/Sep/2010 Y.NISHIYAMA	FAR-2117 SER.		外寸図
SCALE 1/8	MASS 11 ±10% kg	NAME	MONITOR UNIT (FLUSH MOUNT)
DWG.No. C3519-G05- C	REF.No. 03-163-110G-2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

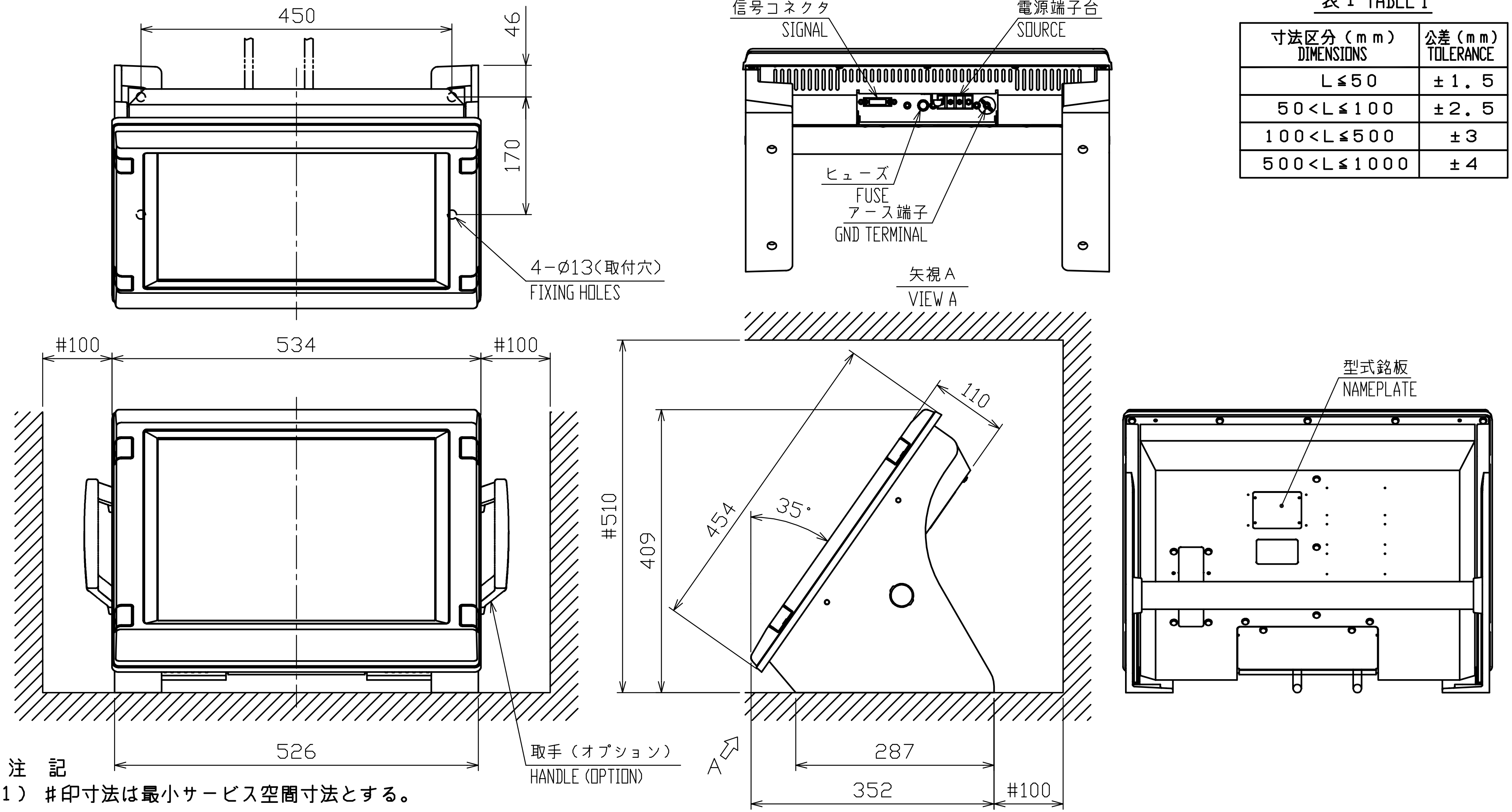


表 1 TABLE 1

寸法区分（mm）DIMENSIONS	公差（mm）TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3
500<L≦1000	±4

注 記

1） #印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表１による。
3） 取付にはＭ１０ボルトまたはコーチボルト呼び径９を使用のこと。

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M10 BOLTS OR COACH SCREWS ϕ9 FOR FIXING THE UNIT.

DRAWN	Jan. 7 '04 E. MIYOSHI	TITLE	MU-201CR
CHECKED	Takahashi T.	名称	表示部（卓上装備）
APPROVED	Y. Hatai	FAR-2117 SER.	外寸図
SCALE	1/8 MASS 17.0 ±10% kg	NAME	MONITOR UNIT (DESKTOP MOUNT)
DWG.No.	C3519-G04- B	03-163-100G-2	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

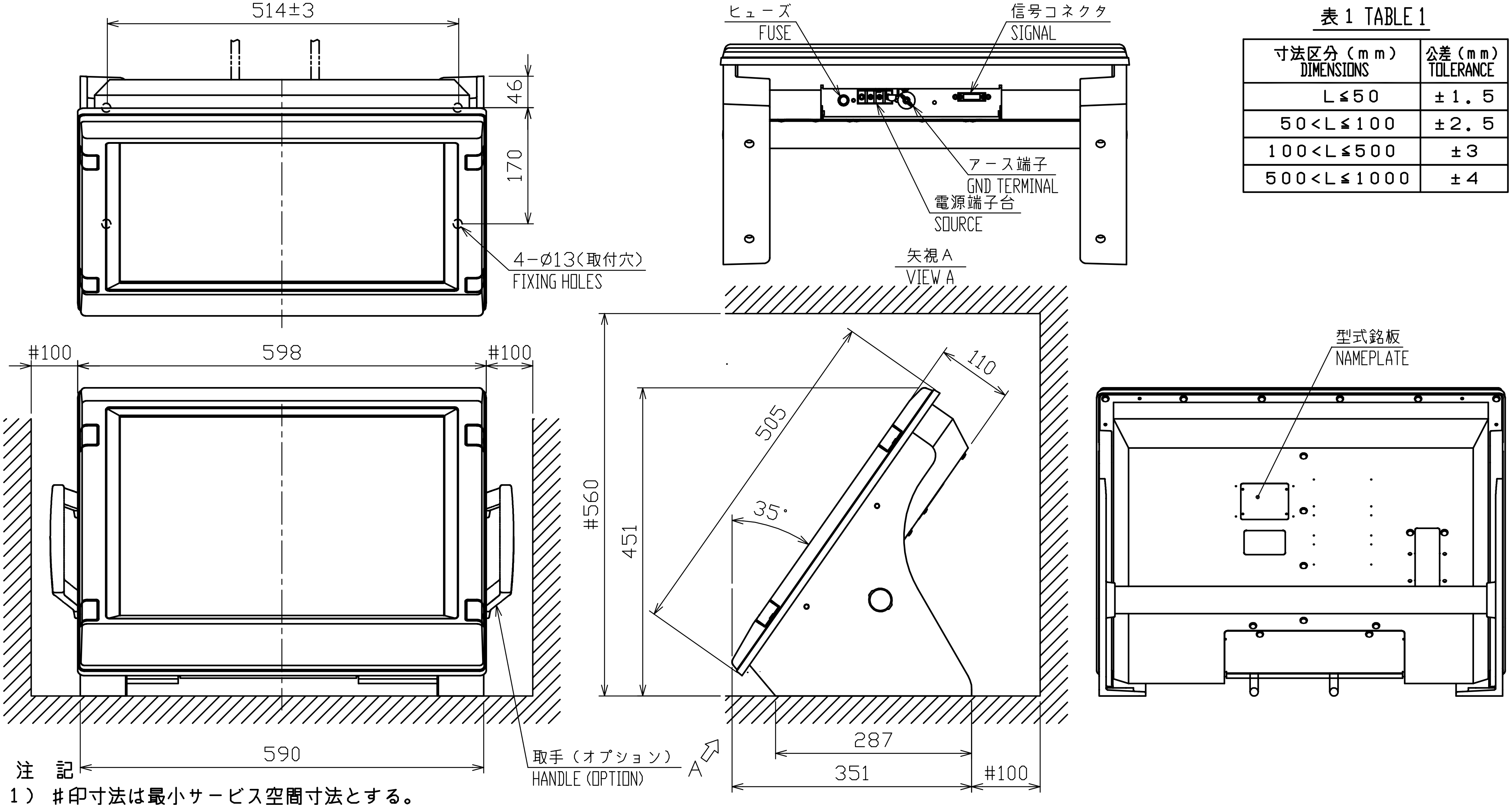


表 1 TABLE 1

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3
500<L≦1000	±4

注　記

1）＃印寸法は最小サービス空間寸法とする。

2）指定外の寸法公差は表１による。

3）取付にはＭ１０ボルトまたはコーチボルト呼び径９を使用のこと。

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M10 BOLTS OR COACH SCREWS ϕ9 FOR FIXING THE UNIT.

DRAWN	Jan. 7 '04 E. MIYOSHI		TITLE	MU-231CR
CHECKED	Takahashi T.		名称	表示部（卓上装備）
APPROVED	Y. Hatai	FAR-2817 SER.		外寸図
SCALE 1/8	MASS 22 ±10% kg		NAME	MONITOR UNIT (DESKTOP MOUNT)
DWG.No.	C3524-G01- B	03-163-200G-2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

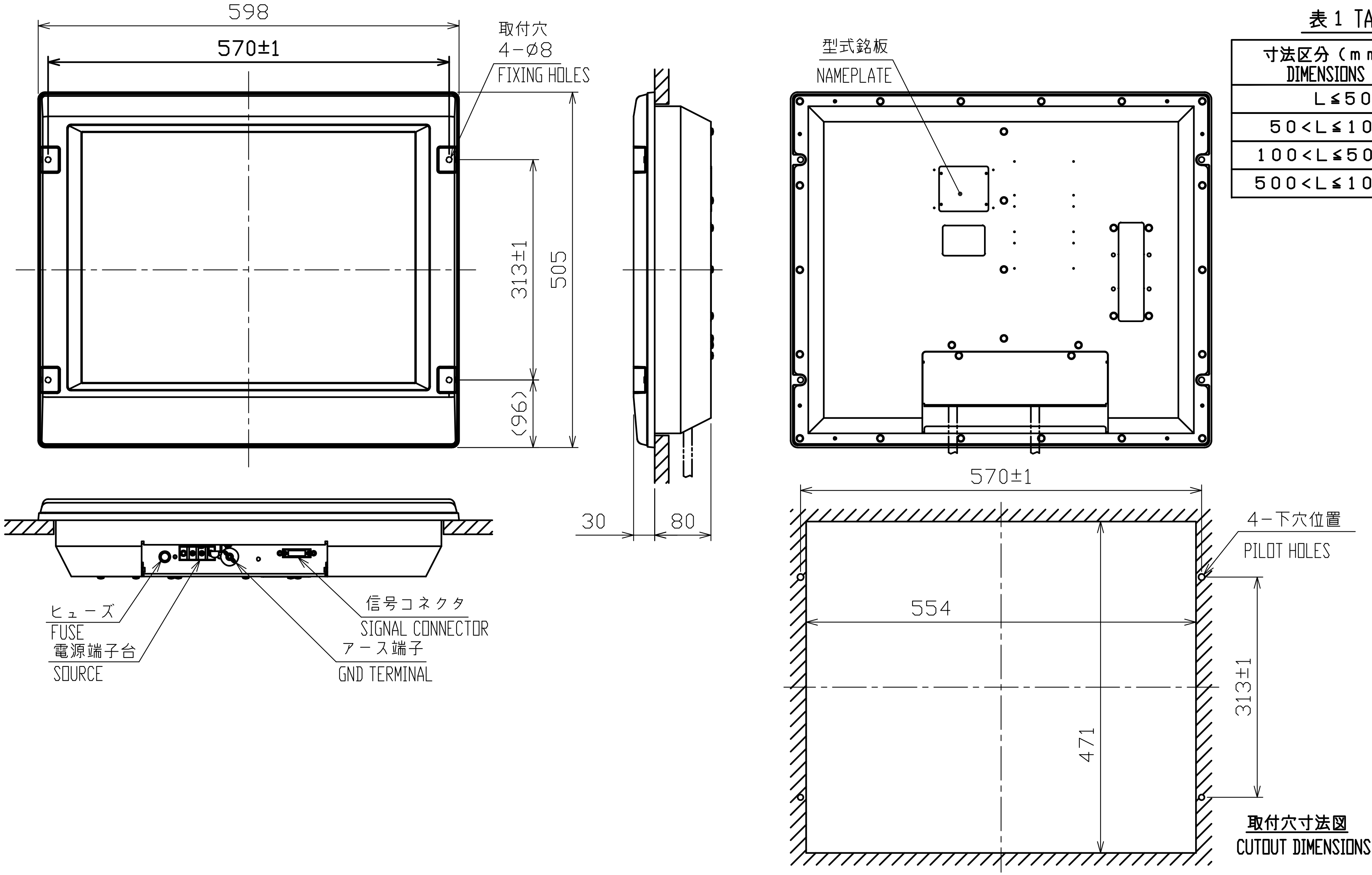


表 1 TABLE 1

寸法区分（ｍｍ） DIMENSIONS	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０<Ｌ≦１００	±２．５
１００<Ｌ≦５００	±３
５００<Ｌ≦１０００	±４

注　記　１）指定外の寸法公差は表１による。
２）取付には＋トラスタッピンネジ呼び径６Ｘ３０を使用のこと。

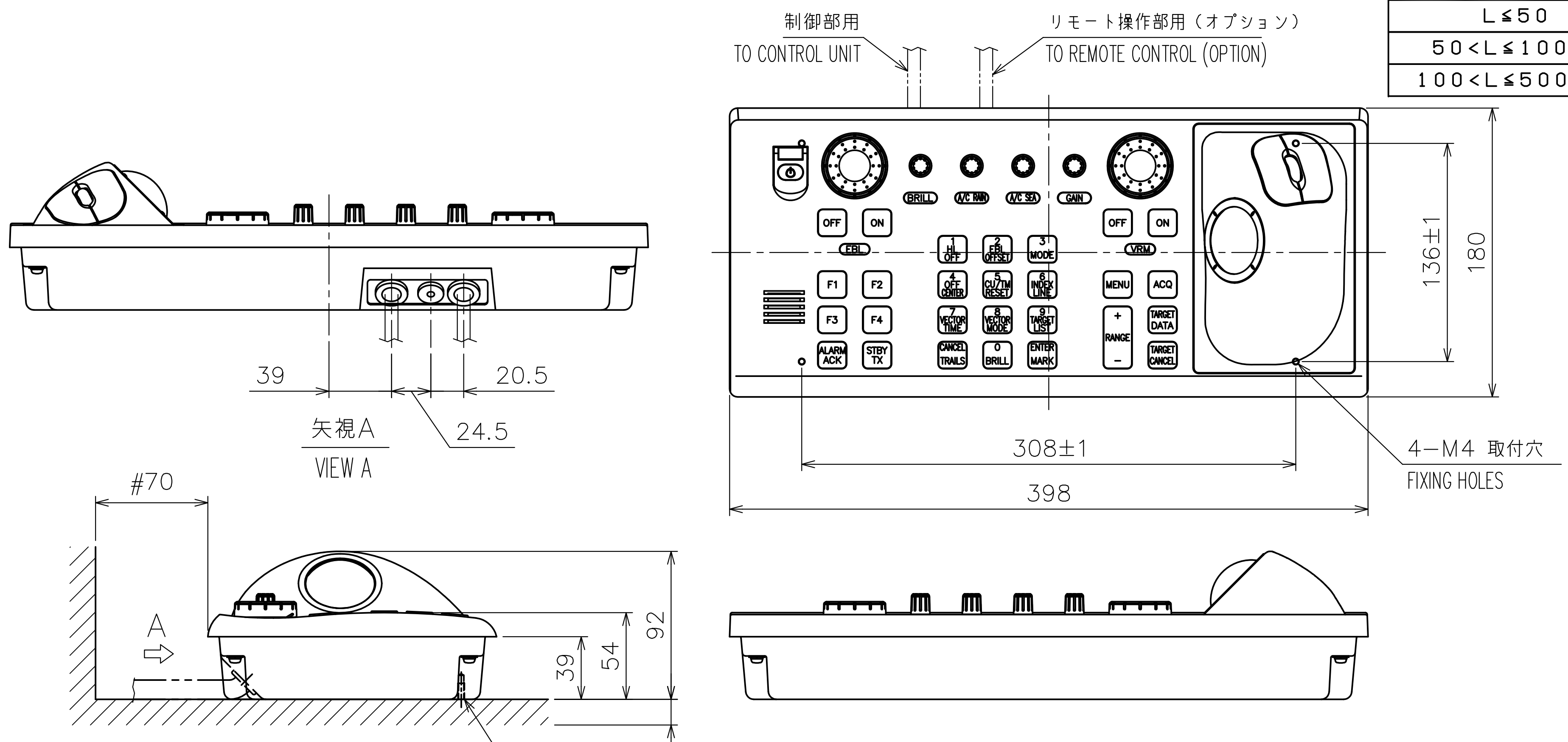
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE TAPPING SCREWS ø6x30 FOR FIXING THE UNIT.

DRAWN 1/Sep/2010 T.YAMASAKI		TITLE	MU-231CR
CHECKED 1/Sep/2010 T.TAKAHASHI		名称	表示部（埋込装備）
APPROVED 1/Sep/2010 Y.NISHIYAMA	FAR-2817 SER.		外寸図
SCALE 1/8	MASS 15 ±10% kg	NAME	MONITOR UNIT (FLUSH MOUNT)
DWG.No. C3524-G02- C	REF.No. 03-163-210G-2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

表 1 TABLE 1

寸法区分（ｍｍ） DIMENSION	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３



注　記　１）＃印寸法は最小サービス空間寸法とする。

２）指定外の寸法公差は表１による。

３）取付用ネジはセムスＢ（Ｍ４Ｘ１２）を使用のこと。
取付面板厚（t）は2≦t≦4とする。それ以外は、
ネジ長さを（ｔ＋７．８）±２ とする。

NOTE

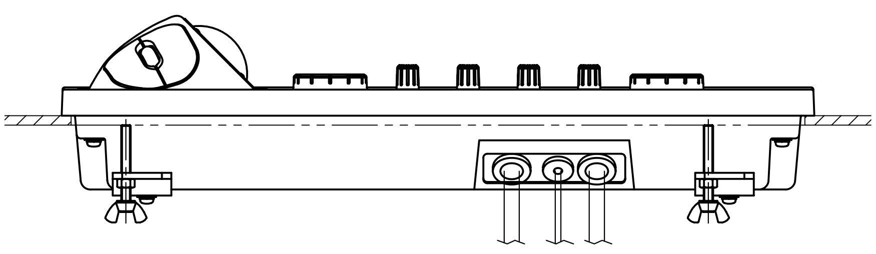
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M4x12 SCREWS FOR FIXING THE UNIT.
THICKNESS OF MOUNTING BOARD(t) SHOULD BE 2≦t≦4.
FOR THICKER ONE USE SCREW LENGTH: (t+7.8)±2.

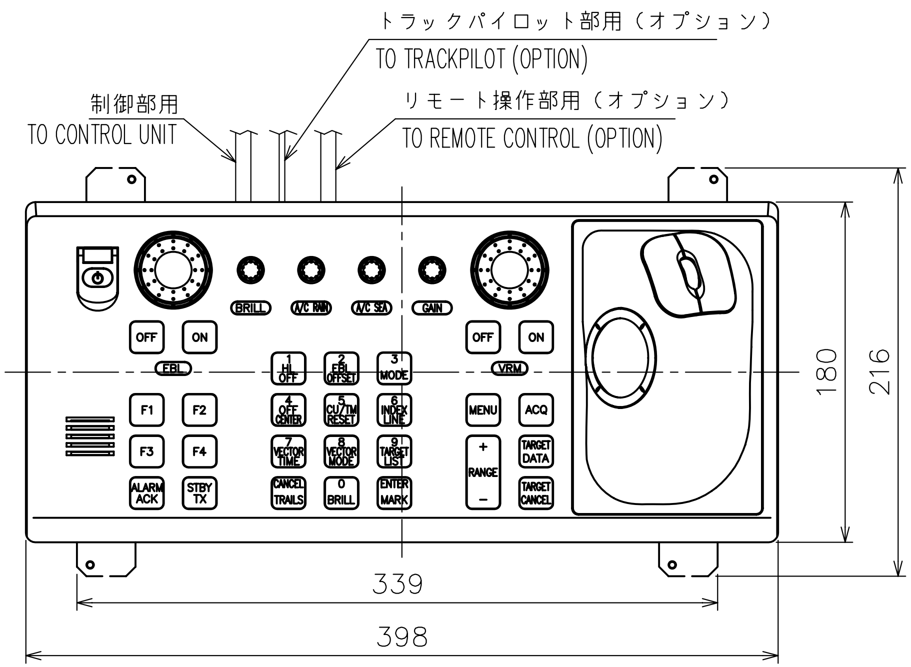
DRAWN	Jan. 11 '08 T.YAMASAKI		TITLE	RCU-014/020
CHECKED	Jan. 11 '08 T.TAKENO		名称	操作部
APPROVED	Jan.18'08 R.Esumi	FCR-2117 SER. FAR-2117 SER.		外寸図
SCALE 1/4	MASS 3.7 ±10% kg	質量は10mケーブルを含む MASS INCLUDES 10m CABLE.	NAME	CONTROL UNIT
DWG.No.	C3519-G06- E	03-163-750G-4		OUTLINE DRAWING

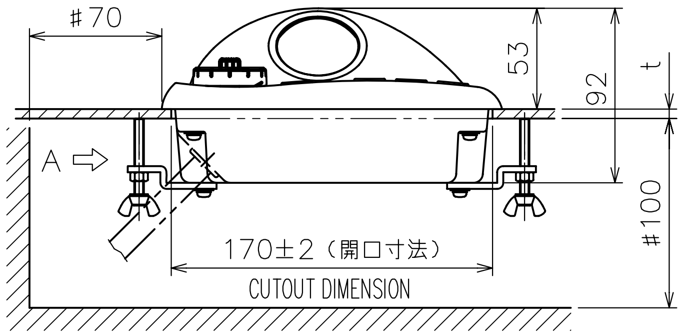
FURUNO ELECTRIC CO., LTD.

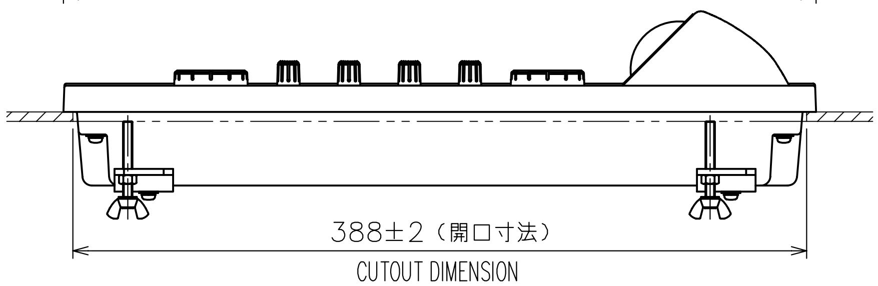
表1 TABLE 1

寸法区分（ｍｍ） DIMENSION	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３









注　記　１）＃印寸法は最小サービス空間寸法とする。
２）指定外の寸法公差は表１による。
３）取付面板厚（ｔ）は最大２０とする。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. THICKNESS OF MOUNTING BOARD(t) SHOULD BE MAX. 20.

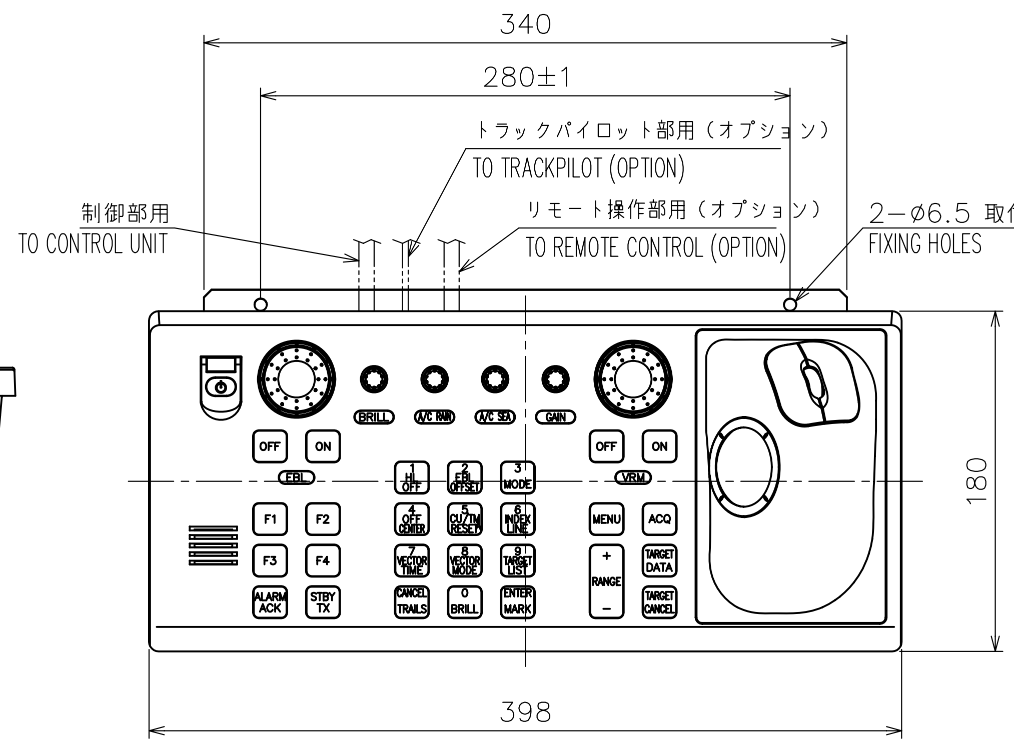
DRAWN	Apr. 19 '07 T.YAMASAKI	TITLE	RCU-014/020
CHECKED	Apr. 19 '07 T.TAKENO	名称	操作部（埋込装備）
APPROVED	Apr.23'07 R.Esumi — FCR-2117 SER. FAR-2117 SER.		外寸図
SCALE	1/4 — MASS 3.8 kg ±10% — 質量は10mケーブルを含む MASS INCLUDES 10m CABLE	NAME	CONTROL UNIT (FLUSH MOUNT)
DWG.No.	C3524-G04- D — 03-163-751G-3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

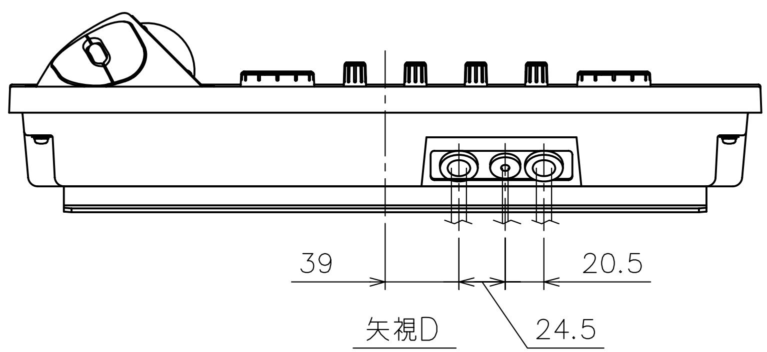
FURUNO

表 1 TABLE 1

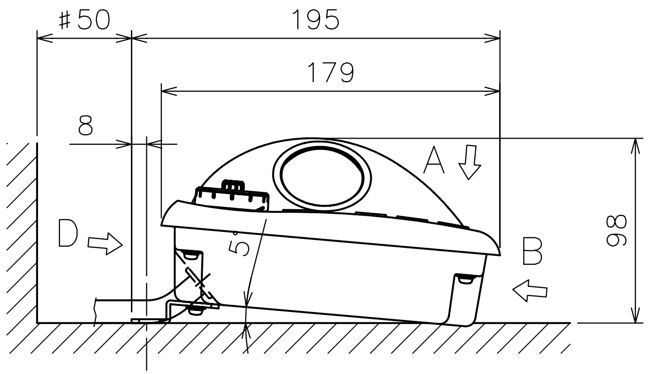
寸法区分（ｍｍ） DIMENSION	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３

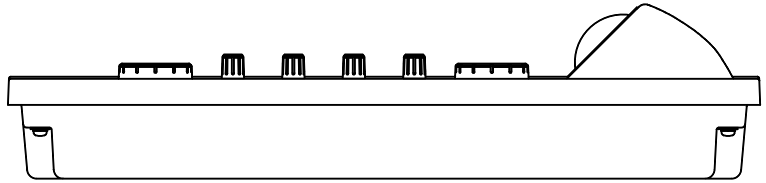


矢視A
VIEW A



矢視D
VIEW D





矢視B
VIEW B

注　記　１）＃印寸法は最小サービス空間寸法とする。
２）指定外の寸法公差は表１による。
３）取付用ネジはトラスタッピンネジ呼び径６、またはＭ６ボルトを使用のこと。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREW ø6 OR M6 BOLTS FOR FIXING THE UNIT.

DRAWN	Apr. 19 '07 T.YAMASAKI	TITLE	RCU-014/020
CHECKED	Apr. 19 '07 T.TAKENO	名称	操作部（直付金具装備）
APPROVED	Apr.23'07 R.Esumi	FCR-2117 SER. FAR-2117 SER.	外寸図
SCALE 1/4	MASS 4.0 ±10% kg	質量は10mケーブルを含む MASS INCLUDES 10m CABLE	NAME CONTROL UNIT (TABLETOP MOUNT W/ KB PLATE)
DWG.No.	C3524-G05- C	03-163-752G-2	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

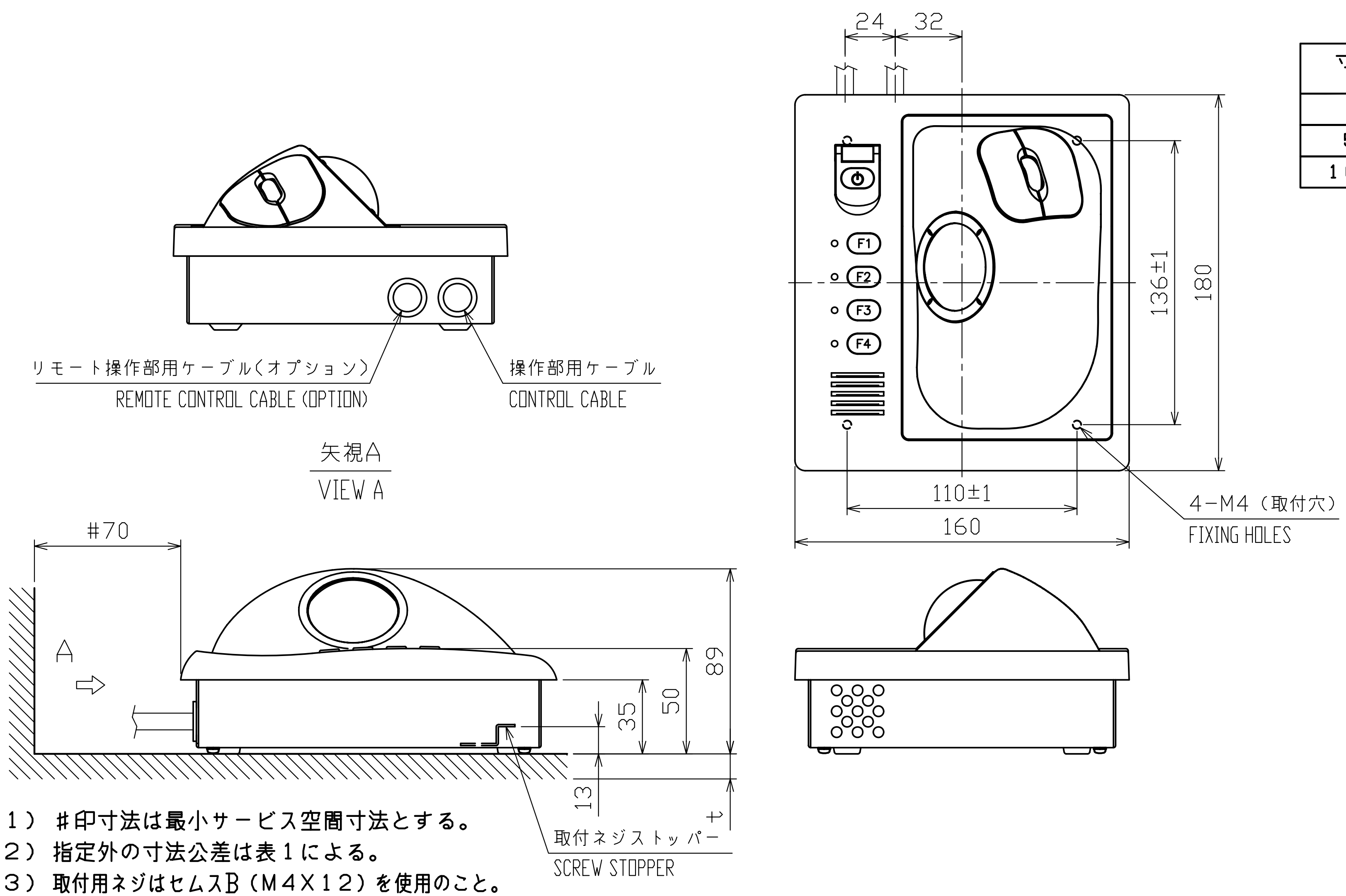


表１ TABLE 1

寸法区分（ｍｍ） DIMENSION	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３

注　記　１）＃印寸法は最小サービス空間寸法とする。
２）指定外の寸法公差は表１による。
３）取付用ネジはセムスB（Ｍ４Ｘ１２）を使用のこと。
取付面板厚(t)は２≦t≦５とする。それ以外は、
ネジ長さを（ｔ＋７．８）±２とする。

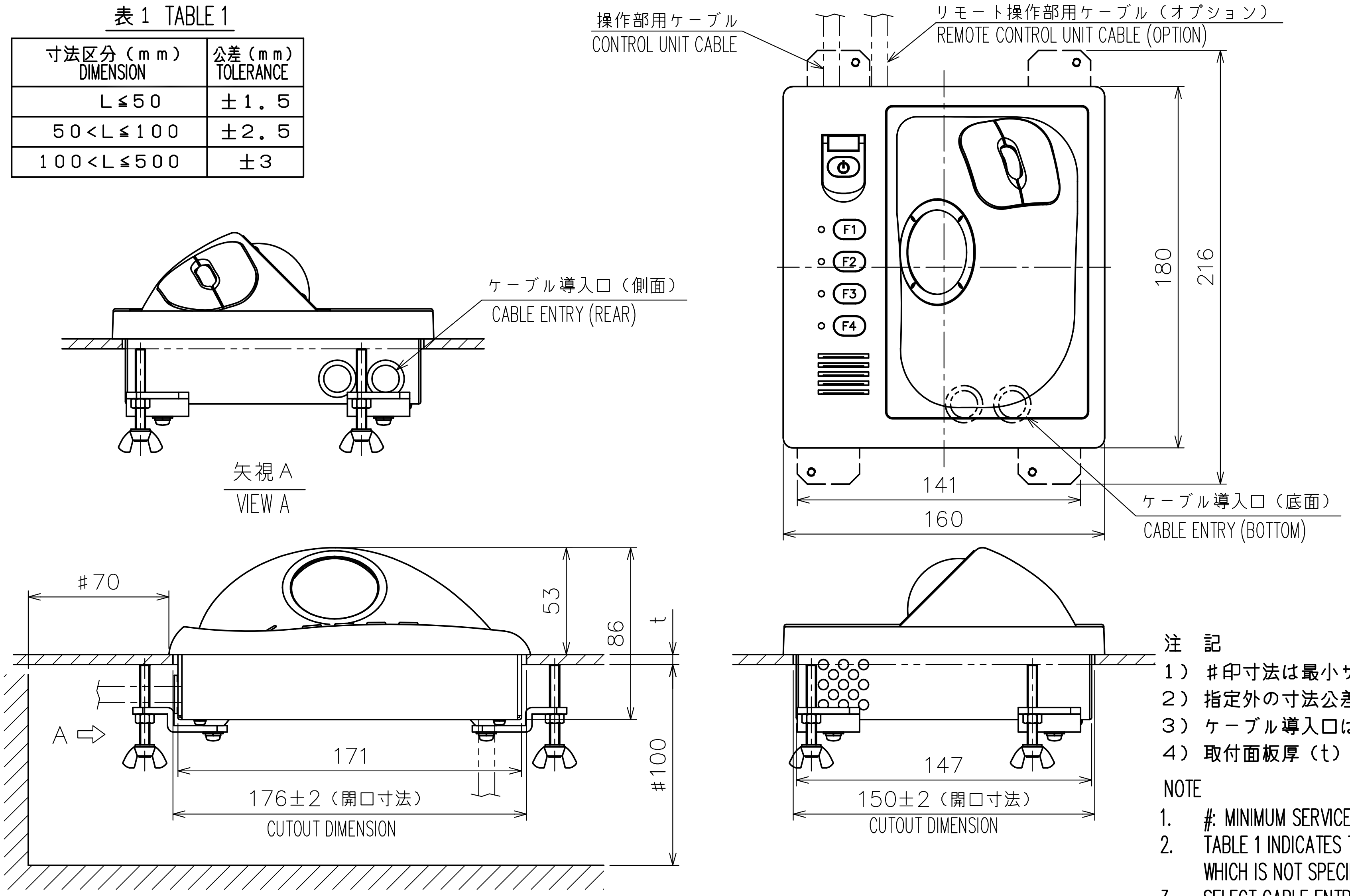
NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M4x12 SCREWS FOR FIXING THE UNIT.
THICKNESS OF MOUNTING BOARD(t) SHOULD BE 2≦t≦5.
FOR THICKER ONE USE SCREW LENGTH: (t+7.8)±2.

DRAWN Apr.17 '07 T.YAMASAKI		TITLE RCU-015/015FEA
CHECKED Apr.17 '07 T.TAKENO		名称 操作部（卓上装備）
APPROVED Apr.23'07 R.Esumi	FCR-2117 SER. FAR-2117 SER.	外寸図
SCALE 1/3 / MASS 2.4 ±10% kg	質量は10mケーブル重さを含む。 MASS W/ 10m CABLE	NAME CONTROL UNIT (DESKTOP MOUNT)
DWG.No. C3519-G13- C	REF.No. 03-163-785G-2	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

表 1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3



注 記

1） #印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表1による。
3） ケーブル導入口は側面・底面から選択のこと。
4） 取付面板厚（t）は最大10とする

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. SELECT CABLE ENTRY FROM REAR OR SIDE.
4. THICKNESS OF MOUNTING BOARD (t) SHOULD BE MAX. 10.

DRAWN Apr. 19 '07 T.YAMASAKI			TITLE RCU-015/015FEA
CHECKED Apr. 19 '07 T.TAKENO			名称 操作部（埋込装備）
APPROVED Apr.23'07 R.Esumi	FCR-2117 SER. FAR-2117 SER.		外寸図
SCALE 1/3	MASS 2.5 ±10% kg	質量は10mケーブル重さを含む。 MASS INCLUDES 10m CABLE	NAME CONTROL UNIT (FLUSH MOUNT)
DWG.No. C3519-G14- D	03-163-786G-2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

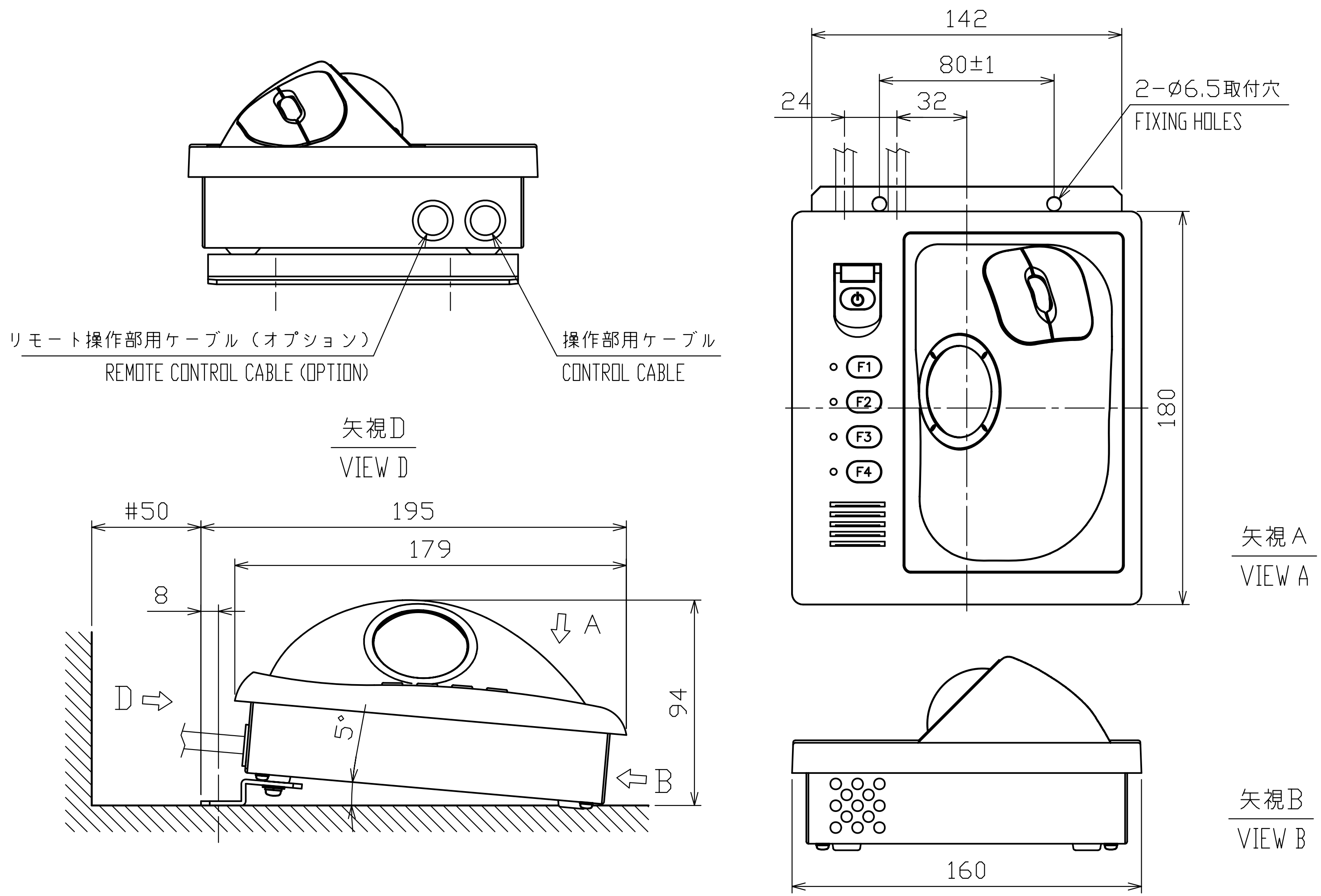


表1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

注　記

1） #印寸法は最小サービス空間寸法とする。

2） 指定外の寸法公差は表1による。

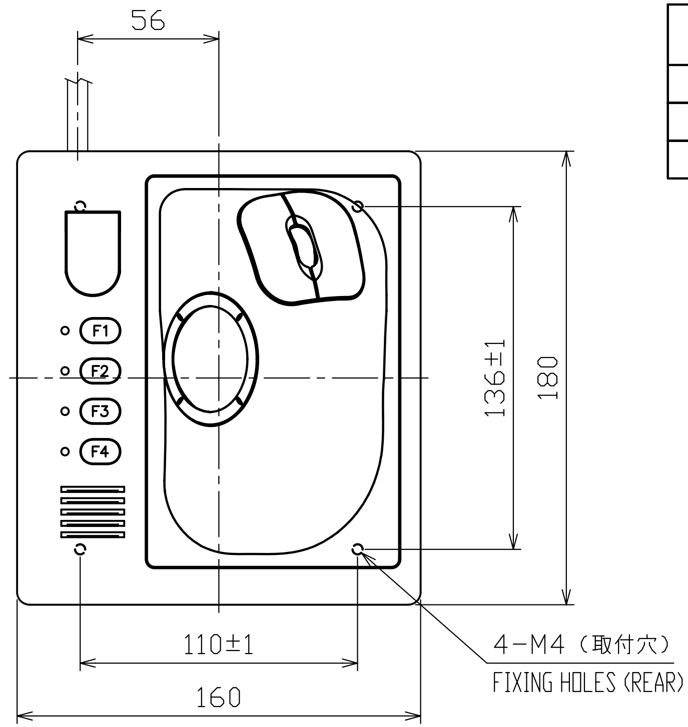
3） 取付にはトラスタッピンネジ呼び径6またはM6ボルトを使用のこと。

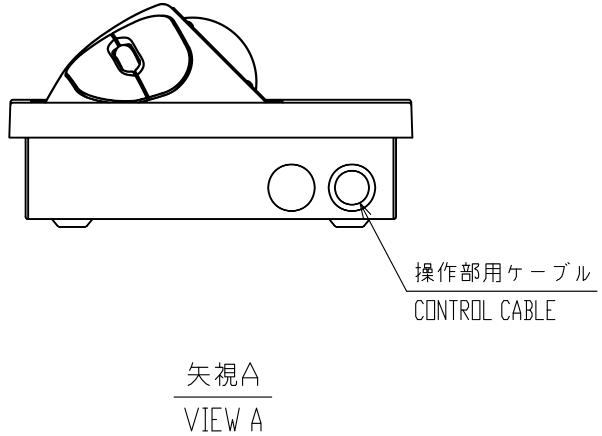
NOTE

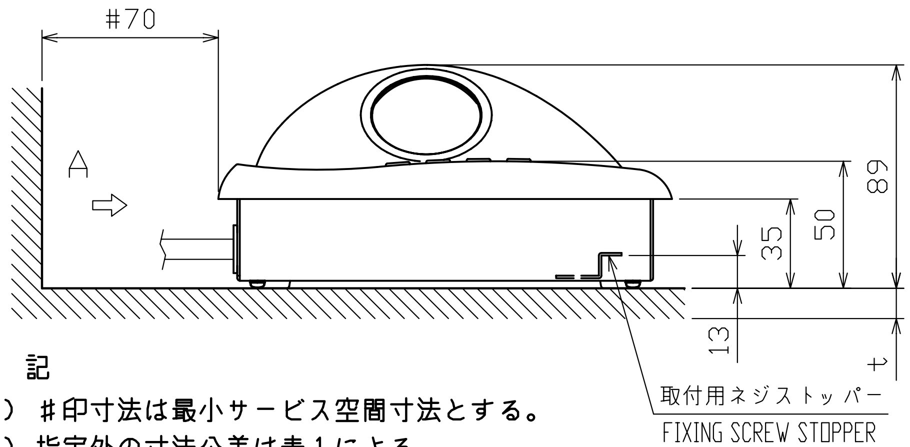
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHITCH IS NOT SPECIFIED.
3. USE TAPPING SCREWS φ6 OR M6 BOLTS FOR FIXING THE UNIT.

DRAWN Apr. 19 '07 T.YAMASAKI		TITLE	RCU-015/015FEA
CHECKED Apr. 19 '07 T.TAKENO		名称	操作部（取付金具装備）
APPROVED Apr.23'07 R.Esumi	FCR-2117 SER. FAR-2117 SER.		外寸図
SCALE 1/3 MASS 2.5 ±10% kg	質量は10mケーブル重さを含む。 MASS W/ 10m CABLE	NAME	CONTROL UNIT (TABLETOP MOUNT W/ FIXTURE)
DWG.No. C3519-G15- C	03-163-787G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.







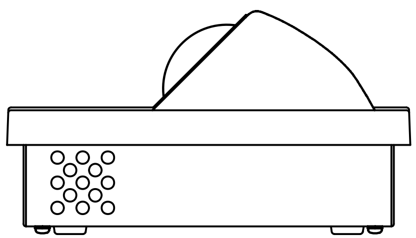


表 1 TABLE 1

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M4x12 SCREWS FOR FIXING. THICKNESS OF MOUNTING BOARD SHOULD BE 2≦t≦5. FOR USING GREATER THICKNESS, USE SCREW WHOSE LENGTH IS (t+7.8) ±2.

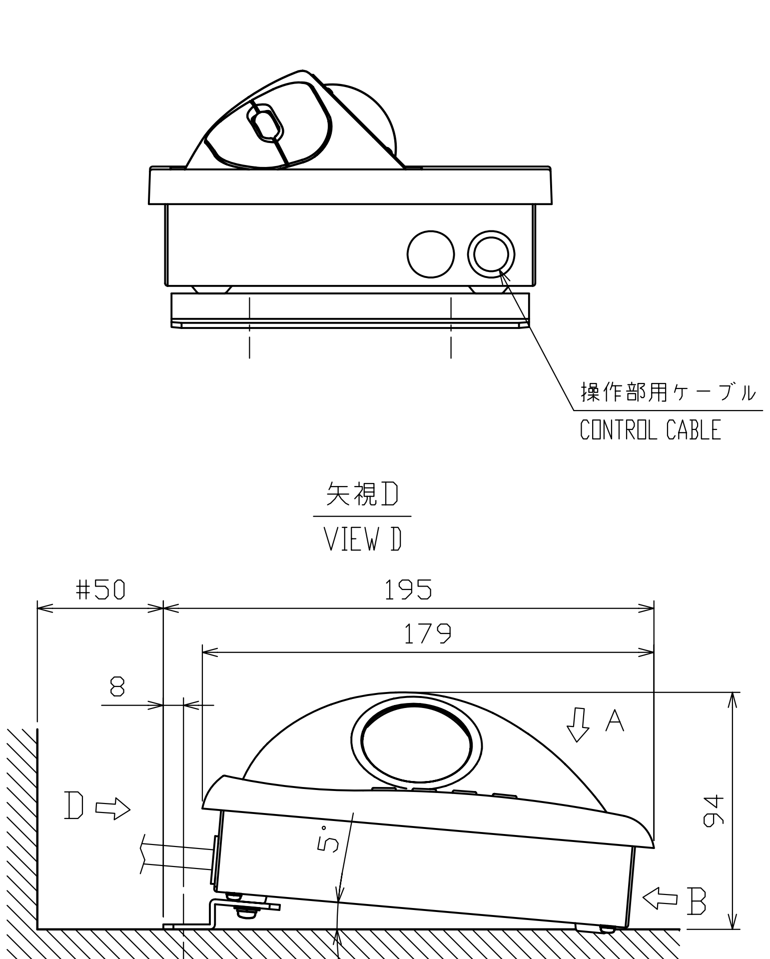
注 記

1） ＃印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表１による。
3） 取付用ネジはセムスB（M４X１２）を使用のこと。
取付面板厚(t)は２≦t≦５とする。
それ以外はネジ長さ（t＋７．８）±２
のセムスBを使用のこと。

DRAWN Feb. 7 '07 E. MIYOSHI		TITLE	RCU-016
CHECKED TAKAHASHI. T		名称	操作部（卓上装備）
APPROVED Y. Hatai	FAR-2117 SER.		外寸図
SCALE 1/3 MASS 2.4 ±10% kg	質量は10mケーブル重さを含む。 MASS W/ 10m CABLE	NAME	CONTROL UNIT (DESKTOP MOUNT)
DWG.No. C3519-G16- C	03-163-780G-4		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



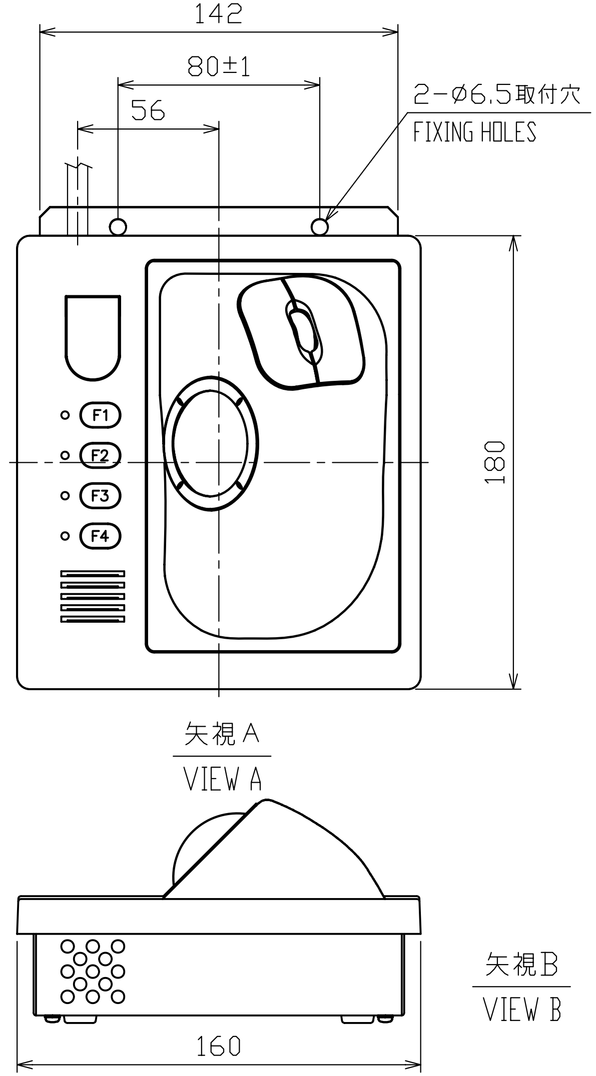


表1 TABLE 1

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

注　記

1） ＃印寸法は最小サービス空間寸法とする。

2） 指定外の寸法公差は表1による。

3） 取付用ネジはトラスタッピンネジ呼び径6、またはM6ボルトを使用のこと。

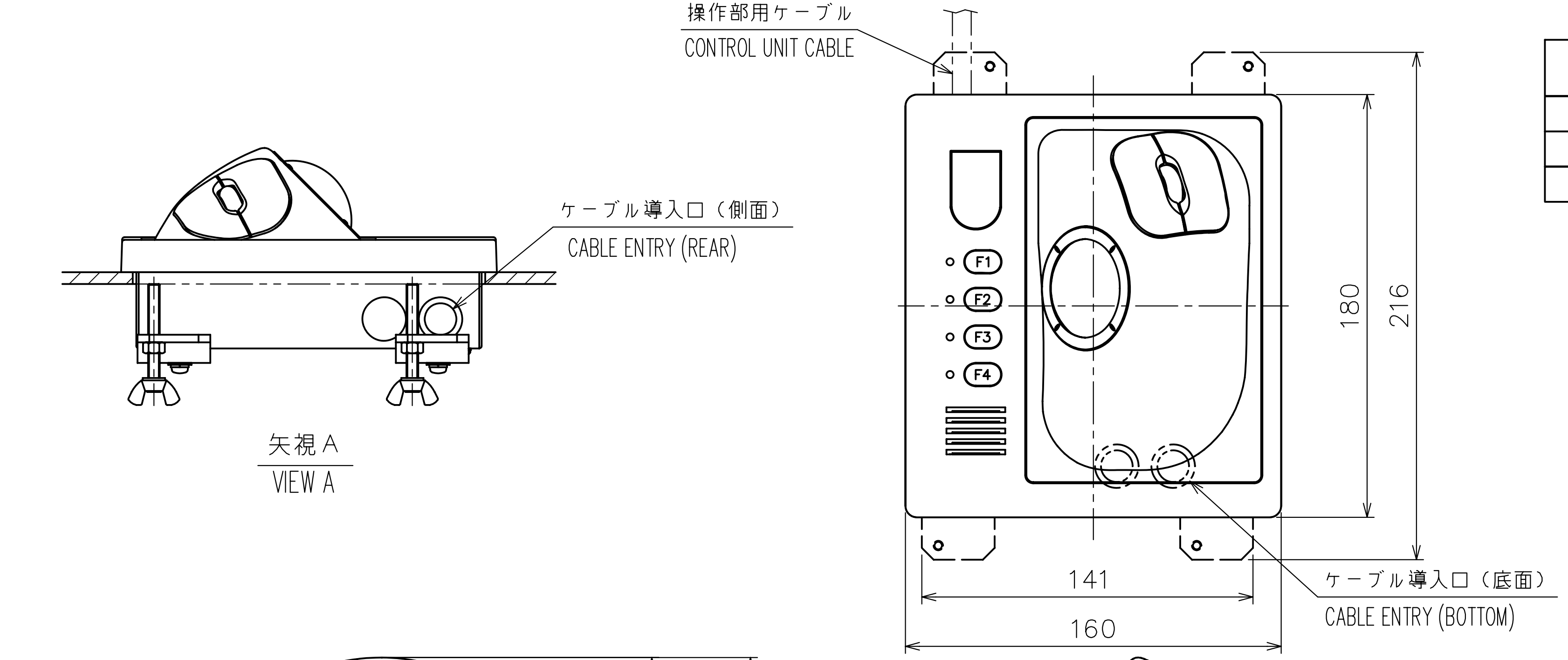
NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS. WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREWS φ6 OR M6 BOLTS FOR FIXING THE UNIT.

DRAWN Feb. 6 '07	E. MIYOSHI		TITLE	RCU-016
CHECKED	TAKAHASHI. T		名称	操作部（取付金具装備）
APPROVED	Y. Hatai	FAR-2117 SER.		外寸図
SCALE 1/3	MASS 2.5 ±10% kg	質量は10mケーブル重さを含む。 MASS W/ 10m CABLE	NAME	CONTROL UNIT (TABLETOP MOUNT W/ FIXTURE)
DWG.No.	C3519-G12- C	03-163-782G-2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



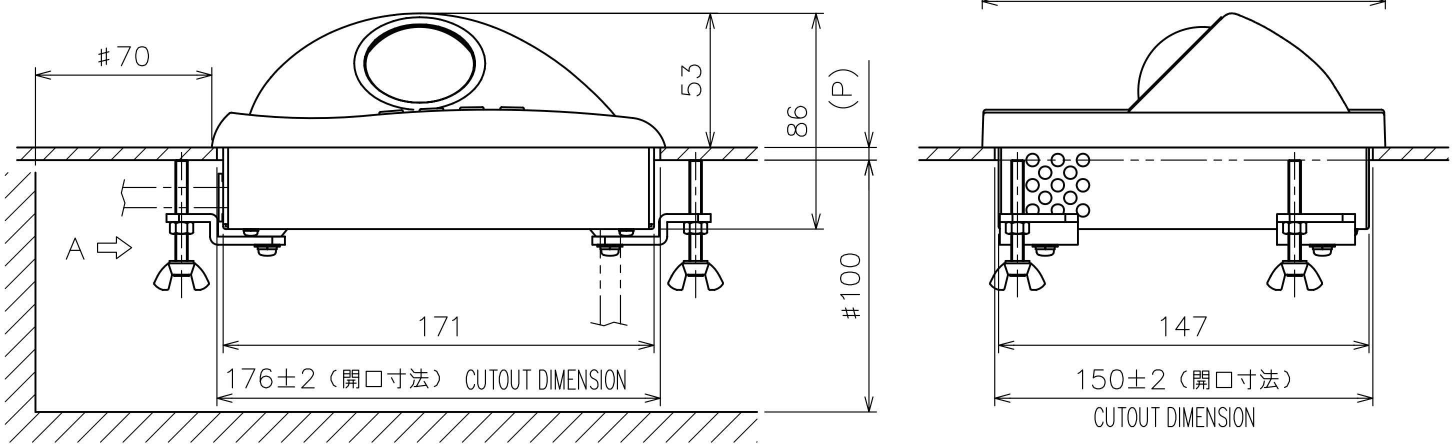


表１ TABLE 1

寸法区分（ｍｍ） DIMENSIONS	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０<Ｌ≦１００	±２．５
１００<Ｌ≦５００	±３

注　記

１）＃印寸法は最小サービス空間寸法とする。
２）指定外の寸法公差は表１による。
３）ケーブル導入口は側面・底面から選択のこと。
４）壁の厚さ（Ｐ）は最大１０とする

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. SELECT CABLE ENTRY FROM REAR OR SIDE.
4. THICKNESS (P): 10 mm MAX.

DRAWN Feb. 6 '07	E. MIYOSHI		TITLE RCU-016
CHECKED	TAKAHASHI. T		名称 操作部（埋込装備）
APPROVED	Y. Hatai	FAR-2117 SER.	外寸図
SCALE 1/3	MASS 2.5 ±10% kg	質量は10mケーブル重さを含む。 MASS W/ 10m CABLE	NAME CONTROL UNIT (FLUSH MOUNT)
DWG.No.	C3519-G11- D	03-163-781G-4	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

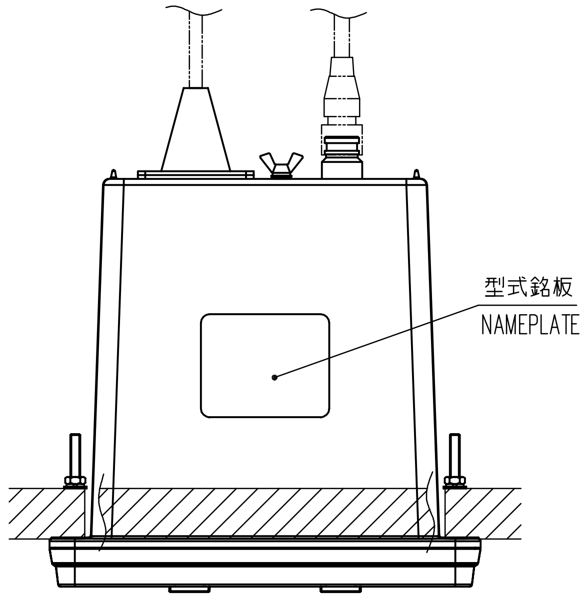
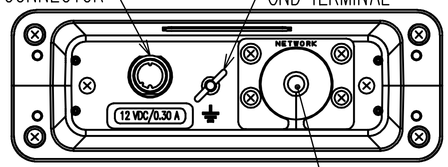
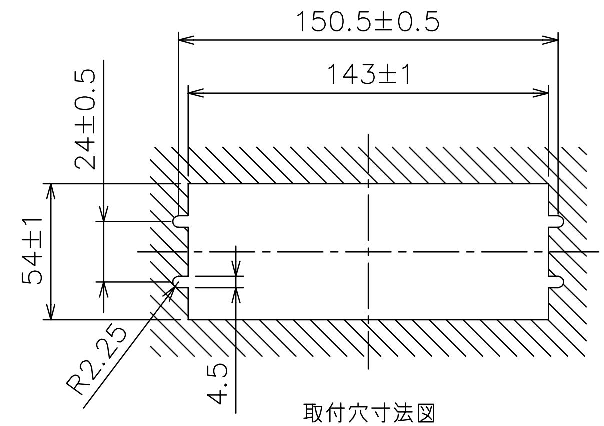


表 1 TABLE 1

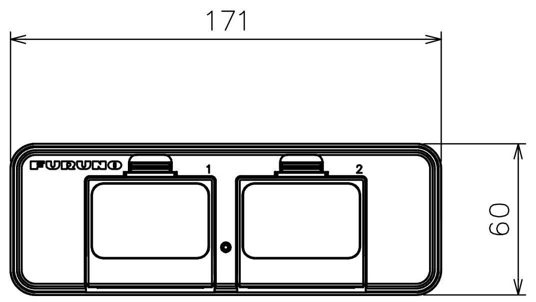
寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50＜L≦100	±2.5
100＜L≦500	±3

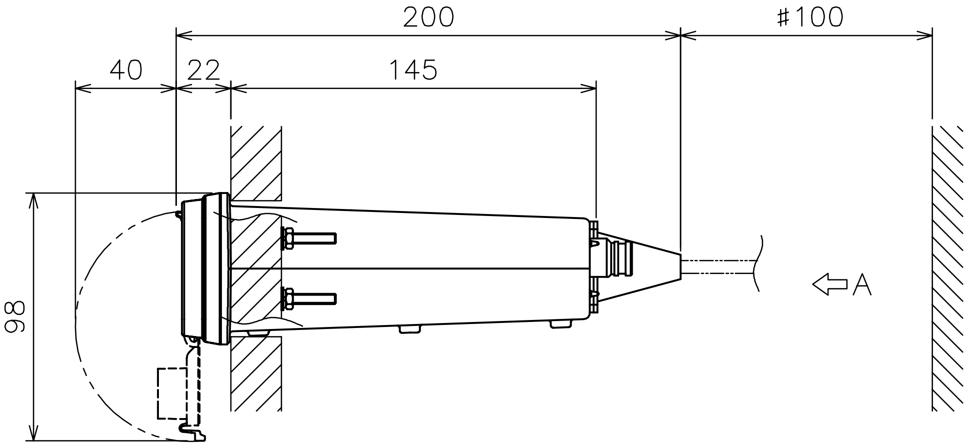


矢視A
VIEW A



取付穴寸法図
CUTOUT DIMENSIONS



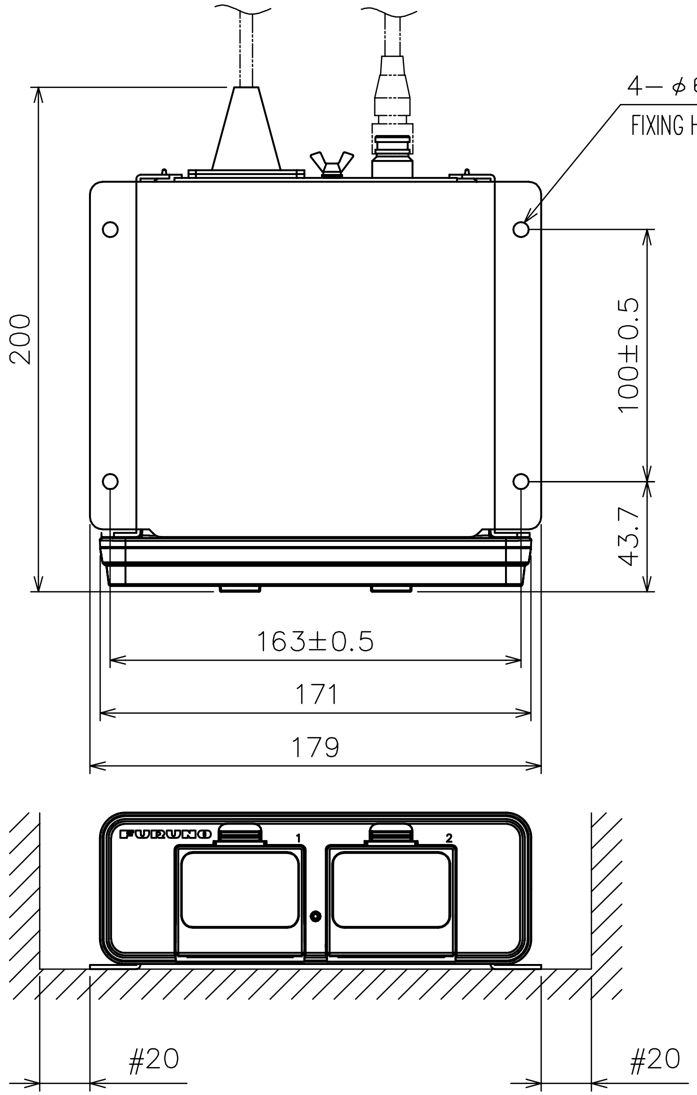


注　記　1）　取付はＭ４Ｘ５０寸切りボルト、Ｍ４平座金、Ｍ４バネ座金、Ｍ４ナット使用のこと。
2）　＃印寸法は最小サービス空間寸法とする。
3）　指定外の寸法公差は表１による。

NOTE
1. USE M4X50 BOLTS, M4 FLAT WASHERS, M4 SPRING WASHERG AND M4 NUTS FOR FIXING.
2. #: MINIMUM SERVICE CLEARANCE.
3. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN Mar. 29 '04 E. MIYOSHI	FAR-2117 SERIES	TITLE	CU-200
CHECKED TAKAHASHI. T	MODEL 1833C	名称	防水型カードインターフェイス(埋込装備)
APPROVED Y. Hatai	MODEL 1833C-BB		外寸図
SCALE 1/3 MASS 0.8 ±10% kg		NAME	MEMORY CARD INTERFACE UNIT (FLUSH MOUNT)
DWG.No. C3532-G04- B	19-023-300G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.



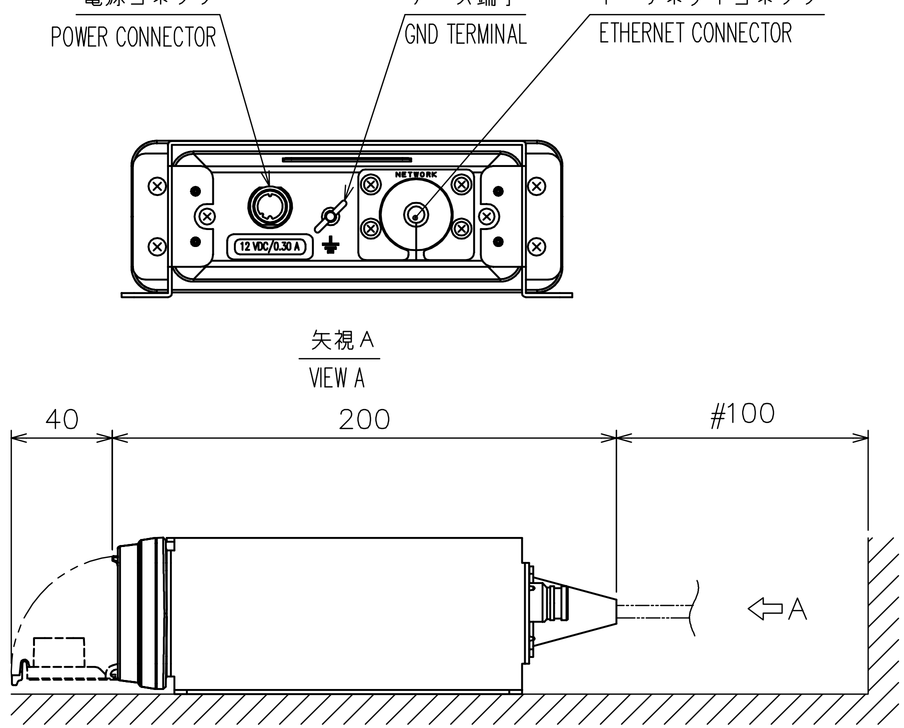


表 1 TABLE 1

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50＜L≦100	±2.5
100＜L≦500	±3

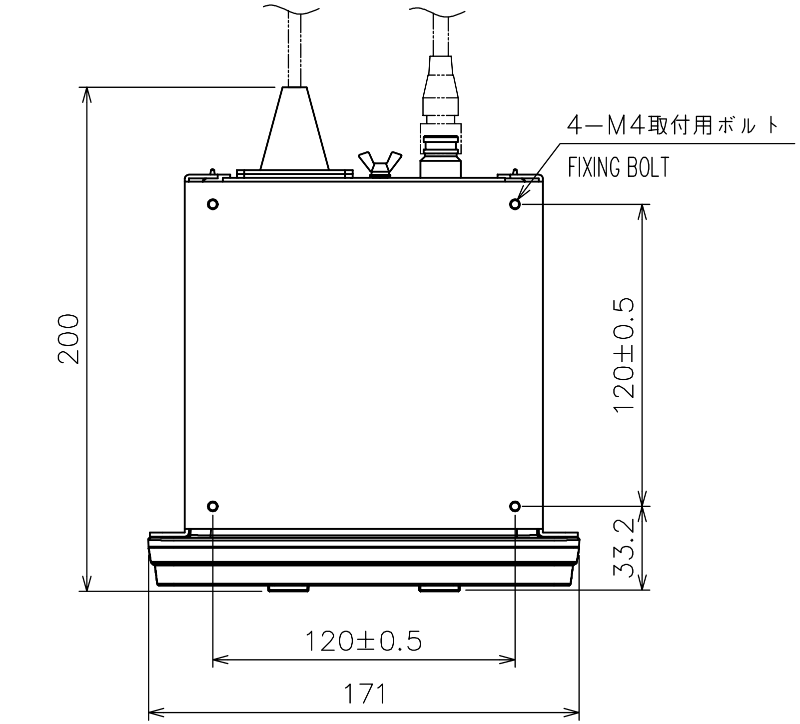
注　記
1）＃印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表１による。
3）取付用ネジは＋トラスタッピンネジ呼び径５×２０を使用のこと。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 5X20 FOR FIXING THE UNIT.

DRAWN Mar. 29 '04 E. MIYOSHI	FAR-2117 SERIES	TITLE	CU-200
CHECKED TAKAHASHI. T	MODEL 1833C	名称	防水型カードインターフェイス(卓上装備)
APPROVED Y. Hatai	MODEL 1833C-BB		外寸図
SCALE 1/3	MASS 1.3 ±10% kg	NAME	MEMORY CARD INTERFACE UNIT (TABLETOP MOUNT)
DWG.No. C3532-G05- B	19-023-310G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

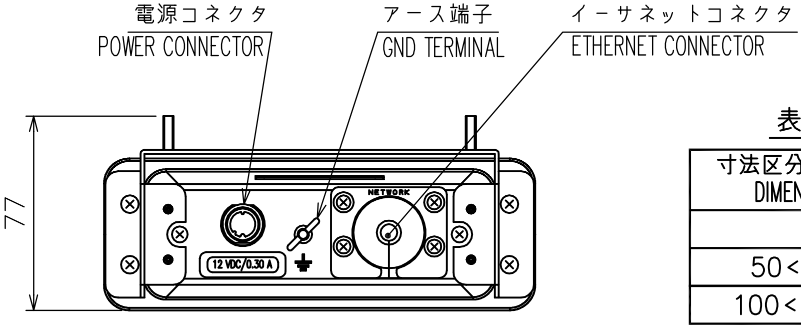


注　記

1） ＃印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表１による。
3） 取付用ナットはＭ４ナットを使用のこと。
4） 取付板厚は最大８ｍｍとする。

NOTE

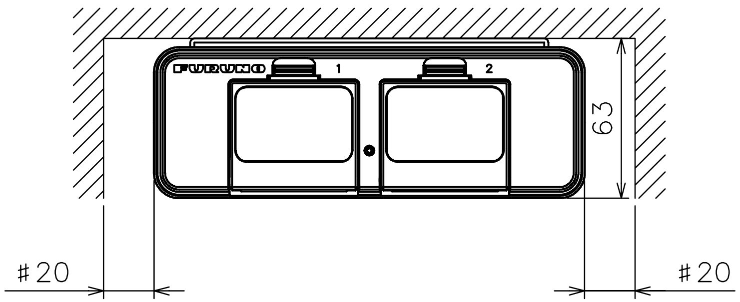
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE NUT M4 FOR FIXING THE UNIT.
4. MAX. MOUNTING BASE THICKNESS IS 8 MM.

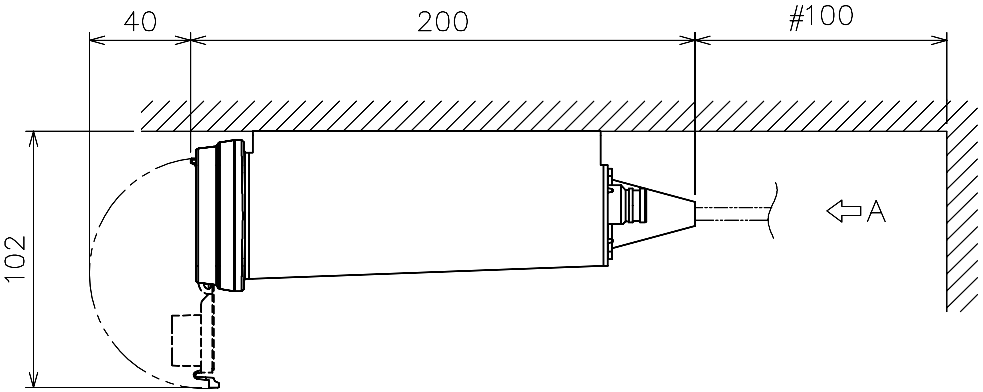


矢視Ａ
VIEW A

表 1 TABLE 1

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50＜L≦100	±2.5
100＜L≦500	±3

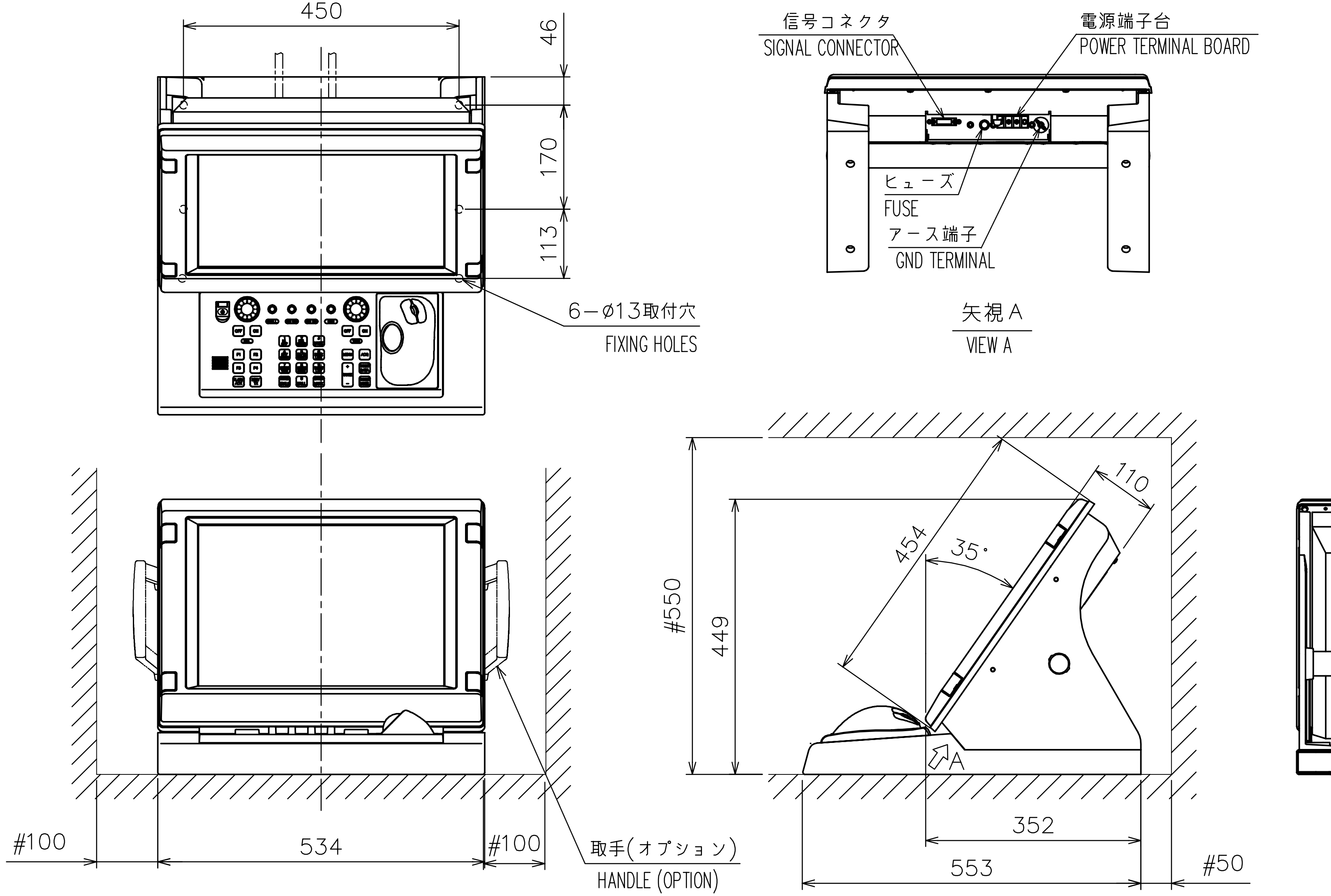




DRAWN Mar. 29 '04 E. MIYOSHI	FAR-2117 SERIES	TITLE	CU-200
CHECKED TAKAHASHI. T	MODEL 1833C	名称	防水型カードインターフェイス(天井装備)
APPROVED Y. Hatai	MODEL 1833C-BB		外寸図
SCALE 1/3 MASS 1.3 ±10% kg		NAME	MEMORY CARD INTERFACE UNIT (OVERHEAD MOUNT)
DWG.No. C3532-G06- B	19-023-320G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



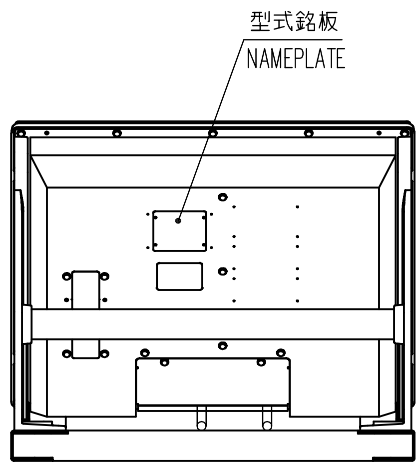


表 1 TABLE 1

寸法区分（ｍｍ）DIMENSIONS (mm)	公差（ｍｍ）TOLERANCE (mm)
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３
５００＜Ｌ≦１０００	±４

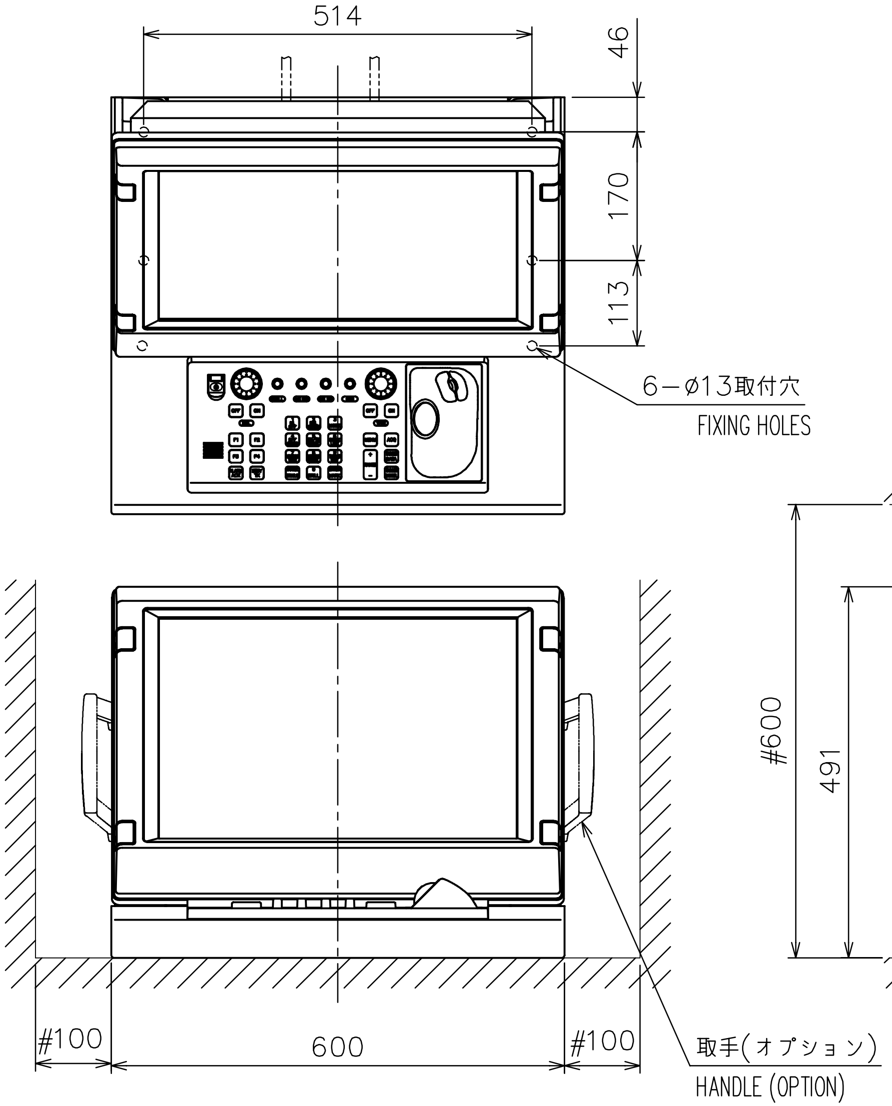
注　記
1）＃印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表１による。
3）取付用ネジはＭ１０ボルト、またはコーチボルト呼び径９を使用のこと。
4）質量は操作部ケーブル（１０ｍ）を含む。

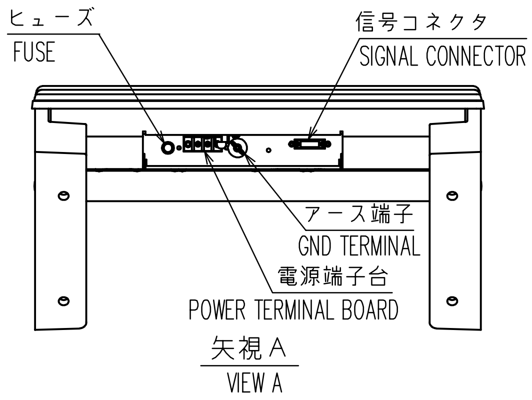
NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M10 BOLTS OR COACH SCREWS ø9 FOR FIXING THE UNIT.
4. MASS INCLUDES CONTROL CABLE (10m).

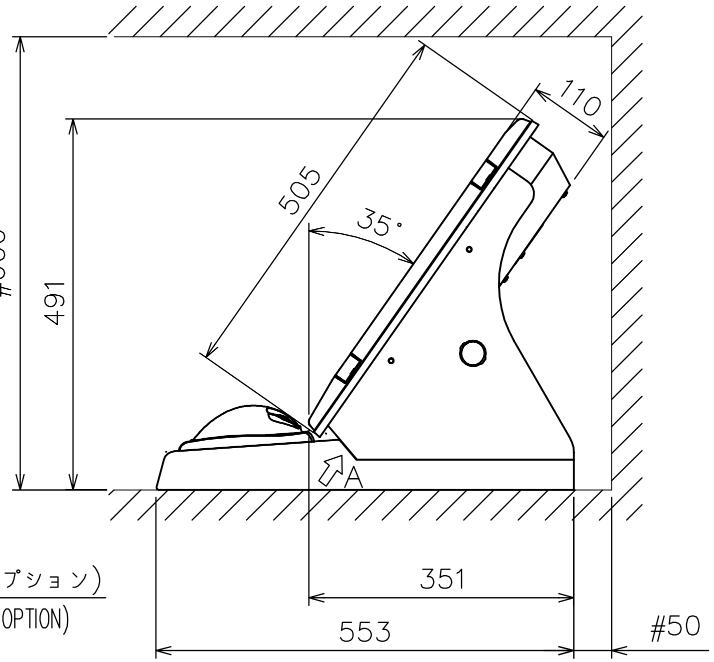
DRAWN Mar. 18 '04 E. MIYOSHI		TITLE	MU-201CR w/ RCU-014
CHECKED TAKAHASHI. T		名称	指示部（連結台タイプ）
APPROVED Y. Hatai	FAR-2107		外寸図
SCALE 1/10 MASS 27 ±10% kg		NAME	DISPLAY UNIT (COMBINATION TYPE)
DWG No. C3519-G27-A	03-163-760G-2		OUTLINE DRAWING

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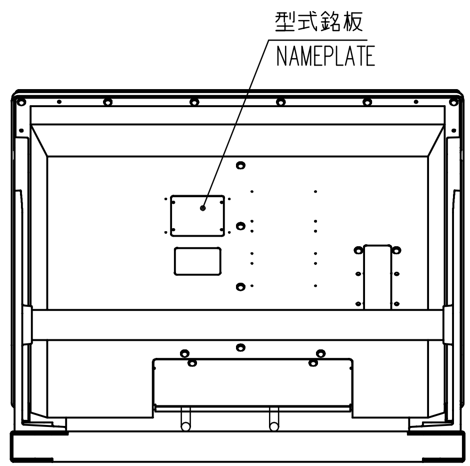


表 1 TABLE 1

寸法区分（ｍｍ） DIMENSIONS (mm)	公差（ｍｍ） TOLERANCE (mm)
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３
５００＜Ｌ≦１０００	±４

注　記
１）　＃印寸法は最小サービス空間寸法とする。
２）　指定外の寸法公差は表１による。
３）　取付用ネジはＭ１０ボルト、またはコーチボルト呼び径９を使用のこと。
４）　質量は操作部ケーブル（１０ｍ）を含む。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M10 BOLTS OR COACH SCREWS ø9 FOR FIXING THE UNIT.
4. MASS INCLUDES CONTROL CABLE (10m).

DRAWN Mar. 18 '04 E. MIYOSHI		TITLE	MU-231CR w/ RCU-014
CHECKED TAKAHASHI. T		名称	指示部（連結台タイプ）
APPROVED Y. Hatai	FAR-2807		外寸図
SCALE 1/10	MASS 33 kg ±10%	NAME	DISPLAY UNIT (COMBINATION TYPE)
DWG No. C3524-G07- A	03-163-761G-2		OUTLINE DRAWING

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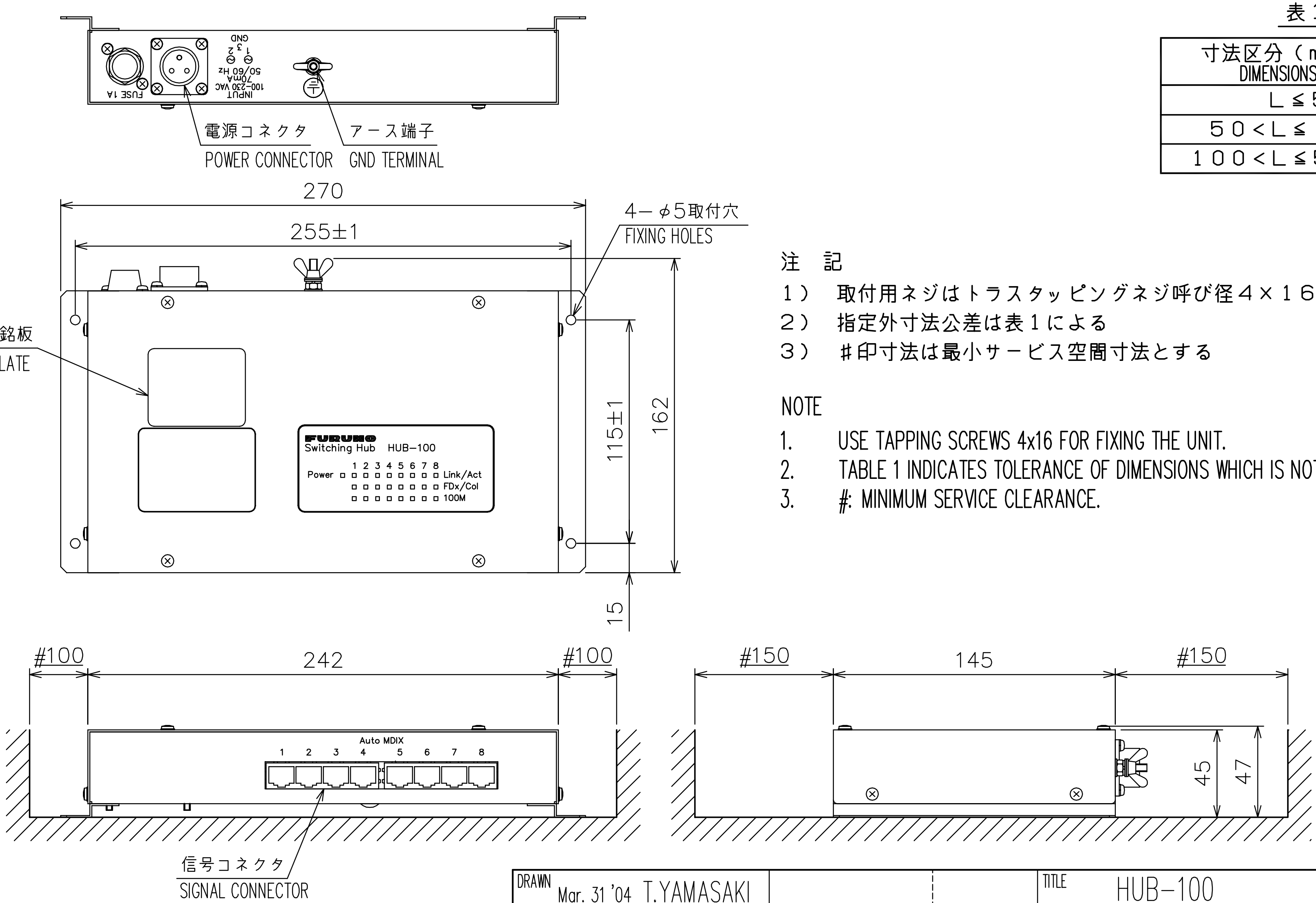


表１ TABLE 1

寸法区分（ｍｍ） DIMENSIONS	公差（ｍｍ） TOLERANCE
Ｌ≦５０	±１．５
５０＜Ｌ≦１００	±２．５
１００＜Ｌ≦５００	±３

注　記

１）　取付用ネジはトラスタッピングネジ呼び径４×１６を使用のこと
２）　指定外寸法公差は表１による
３）　＃印寸法は最小サービス空間寸法とする

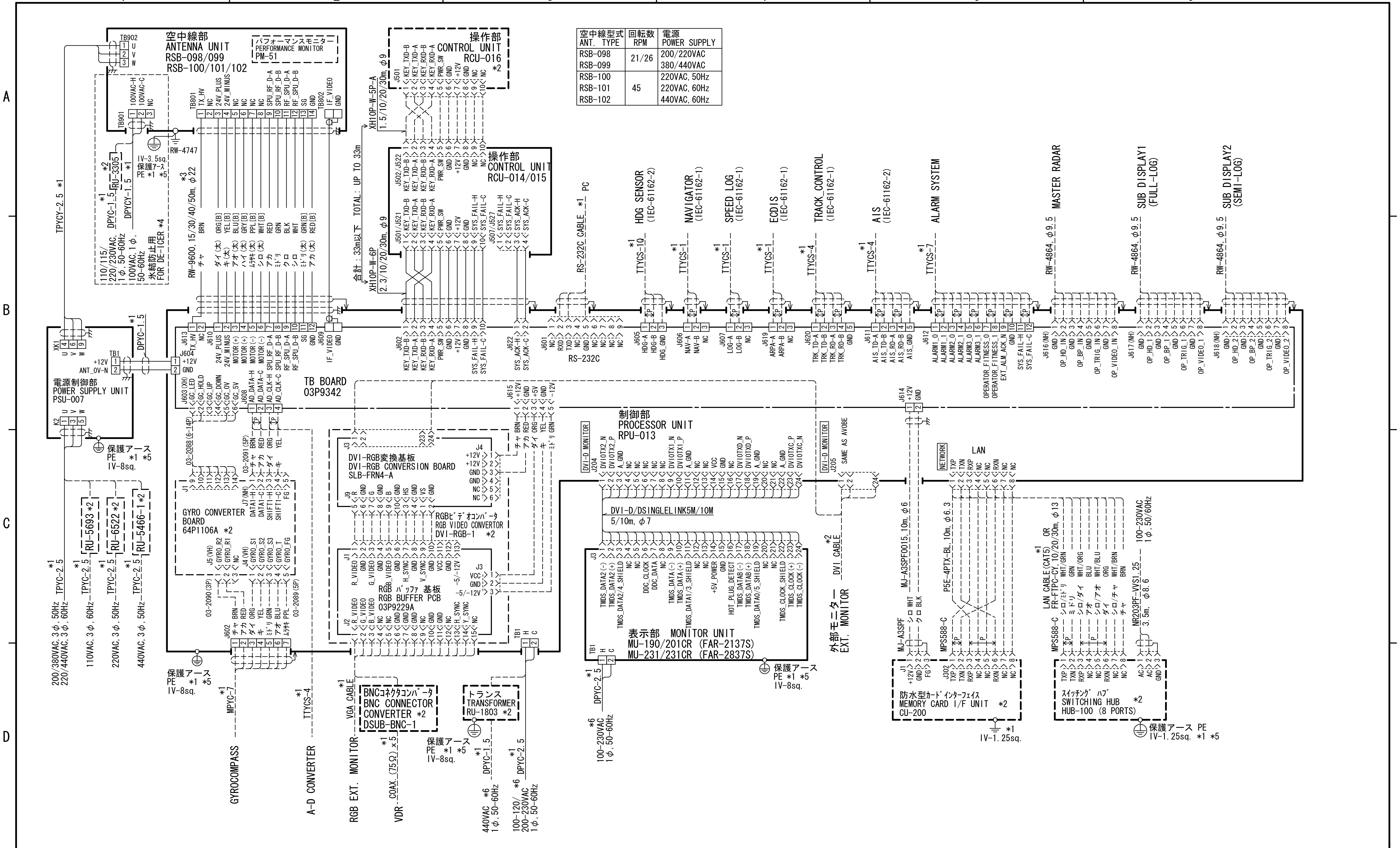
NOTE

1. USE TAPPING SCREWS 4x16 FOR FIXING THE UNIT.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. #: MINIMUM SERVICE CLEARANCE.

DRAWN	Mar. 31 '04 T.YAMASAKI	TITLE	HUB-100
CHECKED	Mar. 31 '04 T.MATSUGUCHI	名称	イーサネットスイッチングハブ
APPROVED	Apr.05'04 T.Matsuguchi		外寸図
SCALE 1/3	MASS 1.5 kg ±10%	NAME	SWITCHING HUB
DWG.No.	C3519-G18- B / 03-163-960G-2		OUTLINE DRAWING

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空中線型式 ANT. TYPE	回転数 RPM	電源 POWER SUPPLY
RSB-098	21/26	200/220VAC
RSB-099		380/440VAC
RSB-100	45	220VAC, 50Hz
RSB-101		220VAC, 60Hz
RSB-102		440VAC, 60Hz

注記
*1 : 造船所手配。
*2 : オプション。
*3 : 最長 100m（延長するときは接続箱RJB-001が必要 ）。
*4 : 船内配電盤では3Aのブレーカを使用。
*5 : 保護アース用ケーブルは緑／黄の絶縁線を使用のこと。
*6 : 交流は両極切りブレーカ（造船所手配）を経由すること。

NOTES
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: MAX. 100m. (JUNCTION BOX RJB-001 IS REQUIRED FOR EXTENSION)
*4: USE 3A BREAKER IN SHIP'S MAINS SWITCH BOX.
*5: USE GRN/YEL WIRE FOR PROTECTIVE EARTH.
*6: PASS THE AC LINE THROUGH A DOUBLE-CONTACT BREAKER (SHIPYARD SUPPLY).

DRAWN 9/Aug/2010	T.YAMASAKI	TYPE	FAR-2137S/2837S
CHECKED 9/Aug/2010	T.TAKAHASHI	名 称	船舶用レーダー/ARPA
APPROVED 10/Aug/2010	Y.NISHIYAMA		相互結線図
SCALE	MASS kg	NAME	MARINE RADAR/ARPA
DWG.No. C3521-C01- P	REF.No. 03-163-6002-3		INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.